

THE IRON AGE

CHESTNUT AND 56TH STREETS, PHILADELPHIA, PA.
Sales Offices
239 WEST 39TH STREET NEW YORK, N. Y.

Owned and Published by



CHILTON COMPANY
(Incorporated)

Executive and Publication Offices,
Chestnut and 56th Sts., Philadelphia, Pa.

C. A. MUSSELMAN, President

FRITZ J. FRANK, Executive Vice-President

FREDERIC C. STEVENS, Vice-President

JOSEPH S. HILDRETH, "

GEORGE H. GRIFFITHS, "

EVERIT B. TERHUNE, "

ERNEST C. HASTINGS, "

WILLIAM A. BARBER, Treasurer

JOHN BLAIR MOFFETT, Secretary

FRITZ J. FRANK

President

J. H. VAN DEVENTER

Editor

C. E. WRIGHT

Managing Editor

R. E. MILLER
Machinery Editor

N. E. MACMILLAN

F. J. WINTERS
Art Editor

Associate Editors

R. G. BINGHAM

F. JURASCHEK
Consulting Editor

Resident District Editors

L. W. MOFFETT R. A. FISKE F. L. PRENTISS F. J. OLIVER T. C. CAMPBELL
Washington Chicago Cleveland Detroit Pittsburgh

Editorial Correspondents

F. B. RICE-OXLEY
London, England

P. FIDRMUC
Hamburg, Germany

F. SANDERSON
Toronto, Ontario

ROY M. EDMONDS
St. Louis

ROBERT G. MCINTOSH
Cincinnati

L. E. MEYER
Milwaukee

ASA ROUNTREE, JR.
Birmingham

A. I. FINDLEY

Editor Emeritus

T. W. LIPPERT
Metallurgical Editor

G. RICCIARDI

G. FRAZAR
Boston

LOREN G. IRWIN
San Francisco

LEROY W. ALLISON
Newark, N. J.

F. T. TURNER
Buffalo

Contents — February 4, 1937

The Moral Challenge	55
Basic Elements of Handling Systems	56
How to Weld 29 Metals	60
Watchman! What of the Night?	64
Die Forged Locomotive Rods	67
Fifty Years of Diversified Effort	72
Iron Ores of New Jersey	74
Automotive Industry	82
Statistics on Metal-Working Activity	86
Rate of Activity in Capital Goods	87
Washington News	88
NEWS CONTENTS	96
Plant Expansion and Equipment Buying	144



Just Between Us Two	170
Products Advertised	176
Index to Advertisers	202

Copyright 1937 by Chilton Company (Inc.)

C. S. BAUR, General Advertising Manager

A. H. DIX, Manager Reader Service

Member, Audit Bureau of Circulations

Member Associated Business Papers

Indexed in the Industrial Arts Index.

Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, \$6.00; Canada, \$8.50, including duty; Foreign \$12.00 a year. Single copy, 25 cents. Cable Address, "Ironage, N. Y."

ADVERTISING STAFF

Emerson Findley, 621 Union Bldg., Cleveland

B. L. Herman, Chilton Bldg., Chestnut & 56th Sts., Philadelphia, Pa.

H. K. Hottenstein, 802 Otis Bldg., Chicago

H. E. Leonard, 239 W. 39th St., New York

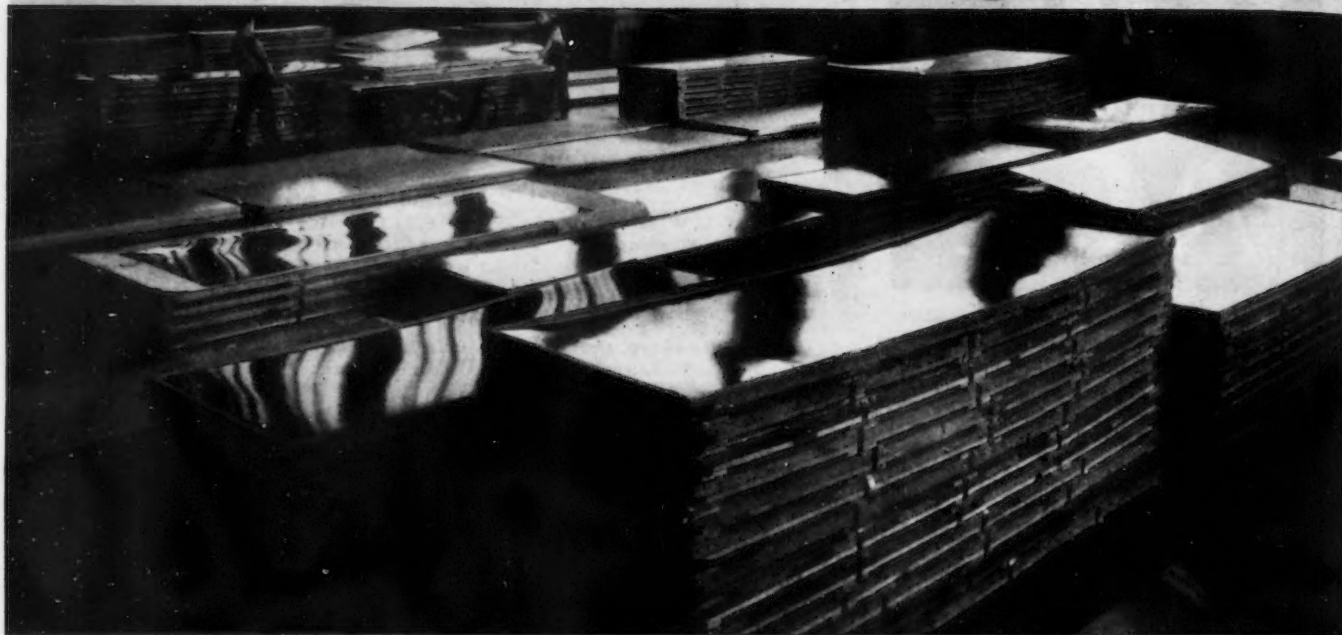
Peirce Lewis, 7310 Woodward Ave., Detroit

C. H. Ober, 239 W. 39th St., New York

W. B. Robinson, 428 Park Bldg., Pittsburgh

D. C. Warren, P. O. Box 81, Hartford, Conn

**Ryerson steel stocks include Allegheny
Stainless sheets in a full range of sizes**



**Also more than 25 other kinds of sheets
are in stock for immediate shipment**



**Together with all general Steel Products, such as
Angles, Channels, Bolts, Rivets, Welding Rod, Etc.**

The Ryerson Stock List is your guide to these large stocks of steel and allied products. If you do not have the current copy, write and we will send it.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Philadelphia, Buffalo, Boston, Jersey City

RYERSON

... THE IRON AGE ...

FEBRUARY 4, 1937

ESTABLISHED 1855

Vol. 139, No. 5

The Moral Challenge

MADAM SECRETARY OF LABOR PERKINS, in rebuking Alfred P. Sloan, Jr., last week for failing to accept her invitation to confer with John Lewis, stated as follows:

"I think there is a moral challenge involved in this situation. It is one that the American people should face. A large number of employees agree to meet with their employers. General Motors will not confer while they remain in their plants. I call this a legalistic obstacle. This is as though a man parked his car on my property and I said I wouldn't talk to him until he removed his car."

We agree with Madam Perkins that there is a moral challenge involved in the situation, but it is not the one that she mentions. It is the moral challenge presented by the refusal of authorities, State and national, to protect the right to work of 250,000 workers who want to work and who cannot because an insignificant minority has seized the plants and holds them for ransom. Dr. Leo Wolman, former head of the Automobile Labor Board and a labor authority, has recently stated that he does not believe that the CIO membership of General Motors workers amounts to more than about 16 per cent at most.

Mr. Sloan is doing no more nor less than his plain duty as an American citizen to refuse to compromise in this situation. Surely the great majority of Americans have not yet become so befuddled by the new school of thought as to share Madam Perkins' doubt as to the moral and technical wrong involved by plant seizures by either majorities or minorities. As Justice Louis D. Brandeis has said:

"I have said that it is essential that the employer should strive only for the right. It is equally important that he should suffer no wrong to be done to him. The history of American liberty rests upon that struggle to resist wrong—to resist it at any cost when first offered."

In expecting one to sit down with another at a table, there is also the matter of table manners to be considered. A gentleman can hardly be expected to sit at the same table with a loud-mouthed and conceited braggart whose every other word consists of threat, vituperation or insult.

Madam Perkins' analogy of the parked car is not very convincing. If some one parked a car in her driveway, preventing access to her garage, and refused to depart when requested, she would undoubtedly call a policeman. And if he refused to do his duty, he would hear from headquarters.

John Van Dine

MATERIALS HANDLING AS A FACTOR IN ECONOMIC PRODUCTION

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

The Basic Elements of Materials Handling Systems



THE substitution of human intelligence for human muscle in the handling of the materials of production cannot be dated any more than the character of Topsy in "Uncle Tom's Cabin." No one knows who first fitted a pair of wheels and two handles to a skid platform to make the first hand truck. Someone should be credited with the idea of hanging a block from a roof beam and lifting a casting more easily onto a machine in a sling formed at one end of the rope. The roller conveyor must have had some beginning—and certainly the whole family of cranes and derricks trace their common ancestry back to the Egyptian pyramid builders.

It makes no difference today, except that a clear understanding of the functions of all mechanical handling devices may best be had through a consideration of the basic elements entering into their design and construction. Each device can be considered as a means to *lift*, or to *shift*, or to both *lift*

and *shift* a load. But mechanical devices for lifting and shifting of loads do not of themselves alone make systems of materials handling. This is the great fault still to be found in thousands of American industrial plants; that scores and hundreds of excellent mechanical devices are used to handle parts and materials without any planned, logical conception of how they may be best tied together to form an economical *system*.

Two basic principles underlie the design of any comprehensive materials handling system in any industrial plant:

1. Continuous, progressive flow, from beginning to end.
2. The avoidance of any re-handling.

So self-evident are these principles, that it would seem foolish to stress their importance. Yet in literally thousands of plants they are ignored, in part or even in whole. Many plants, like Topsy, have just grown; from small beginnings through the addition of

machine after machine and department after department, haphazardly, until they present a picture of materials and parts being constantly shifted here, there and everywhere from process to process, from operation to operation, with no thought given to the miles of useless travel, the tons of wasted human effort, and the dollars of potential profit swallowed daily in these wild and uncorrelated journeyings.

The first step in the designing of any materials handling system should be a careful charting of production flow. Starting at the point where the raw materials are received at the plant, this study should consider in detail every essential operation that must be performed on the material until it leaves the plant as a finished product. What is the relation of process to process? How can each be located in relation to the preceding and succeeding process so as to cut down the time and distance and effort of moving from one to another? What are the limi-

tations of the building or buildings in which the orderly flow of processes must be housed? How does the cost of making changes necessary to achieve orderly progression compare with the savings to be made from the elimination of effort?

The second step of design is the adaptation of available mechanical handling equipment to this orderly, progressive production flow in such a way as to cut the cost of

handling as much as possible, and at the same time to keep the system flexible. Since handling itself is never for a moment static, any system designed to utilize the cost-saving advantages of mechanical handling devices should not be irrevocably fixed in its nature. It should be capable of change, of expansion. It should lend itself readily to variations in production capacity and methods, and to the addition of new equipment without destroying the value or usefulness of that which is installed for immediate use. This applies more particularly, of course, to equipment with fixed installation features, such as conveyors and overhead trackage. Mobile equipment, such as trucks, is inherently capable of adaptation to changes in the system, and therefore may be considered flexible in this sense.

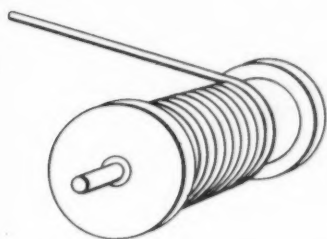
A consideration of the various types of equipment available for incorporation into a system of materials handling should include a discussion of limitations as well as advantages. Further analysis of such equipment shows that the functions of lifting and shifting may be more clearly understood by reference to the fundamental functions of the devices from which the equipment has been developed. At the same time, it should be noted that no hard and fast line can be drawn as between lifting and shifting equipment, because it is in the combination and adaptation of mechanical devices to both

functions that the *system* of handling may be designed.

For example, a hoist, whether hand or power operated, is primarily a lifting device. But when it is mounted on a trolley or a crane running on overhead trackage, or on a swinging arm pivoted to a column or a well, it permits a shifting as well as a lifting of the load. On the other hand, a truck, whether hand or power operated, is primarily a shifting device, but when equipped with an

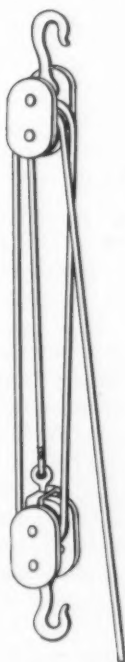
that direct lifting became arduous, a vertical revolving drum was mounted in the bow of a ship, the anchor rope was passed several times around it to secure a purchase, and leverage was applied by means of bars inserted radially in the frame of the drum. Power was multiplied at the expense of speed. Later muscular effort was replaced by steam or electricity to drive the capstan. The same principle governs the winch in all its varied developments. It should be noted that in the capstan and the winch the hoisting cable is not fixed to the drum and does not wind up on it. A few turns of the cable around the drum are taken solely for the purpose of obtaining a grip. As the loaded end of the cable winds up on the drum, a corresponding amount of the free end unwinds.

When the revolving drum is made to act like a reel to which the hoisting cable is fixed and on which it winds, we have the development so widely used in mine hoists and high-speed commercial elevators. Movement up or down can be closely controlled so that loads may be spotted accurately at



AT LEFT

THE revolving drum affords a purchase and multiplies lifting effort.

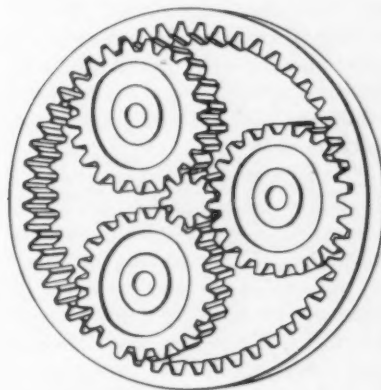


AT LEFT

THE block-and-tackle multiplies pull in proportion to the turns of rope.

AT RIGHT

THE Planetary transmission concentrates power in the hoist head.

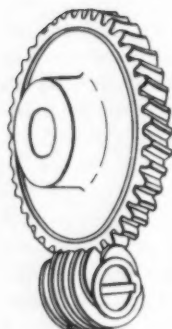


elevating mechanism it permits a lifting as well as a shifting of the load. And, although conveyors are primarily shifting mechanisms, they can be so designed as to lift loads as well.

The following outline reduces all mechanical handling devices to their basic elements. These elements are but twelve in number. Out of them have been developed all the materials handling systems in use today.

1. *The Revolving Drum.* The capstan is one of the earliest forms in which this principle was made available for the service of man. When anchors became so heavy

any point in the vertical plane. In the case of mine hoists and elevators, movement in the horizontal plane is restricted by the guides in which the car runs. In the derrick, on the other hand, a certain amount of horizontal movement is afforded by the swing of the movable boom, but accurate spotting of the loads becomes a matter of the exercise of manual skill in operation. A special adaptation of the principle is found in the skip hoist. Here the hoisting cable draws a car up an inclined plane to a point where a tripping mech-

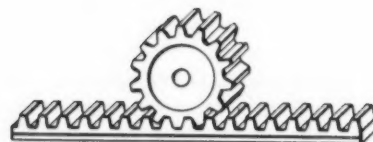
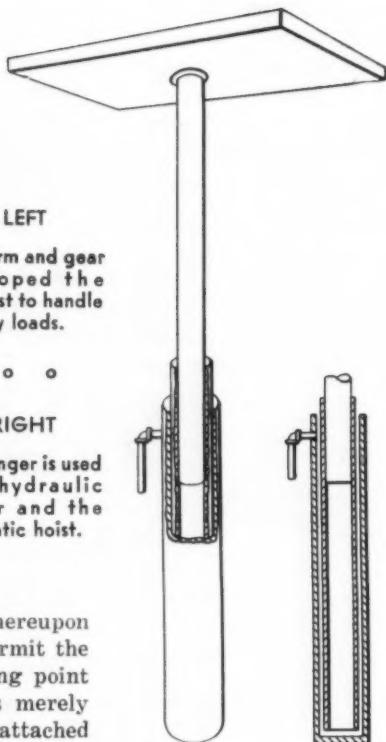


AT LEFT

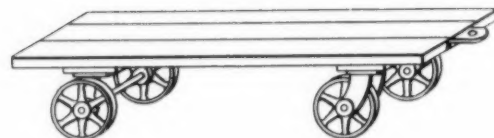
THE worm and gear developed the power hoist to handle heavy loads.

AT RIGHT

THE plunger is used in the hydraulic elevator and the pneumatic hoist.



THE rack-and-pinion is a slow-speed but accurate lifting device.



THE wheeled frame is the most common materials handling device known.

anism dumps the car, whereupon the cable is unreeled to permit the car to return to the loading point again. The grab-bucket is merely a special loading device attached to the end of the hoisting cable of a derrick or crane, and the drag-line utilizes a to and fro movement of a cable to which buckets are attached, and which is controlled in its movements by pivots fixed at each end of the area to be covered by the buckets. All these devices are basically founded on the revolving drum, and their major applications are to be found either in the construction fields, or in cargo handling and other phases of marine work.

2. *The Block-and-Tackle.* This is usually made use of only as a temporary expedient. Power is multiplied at the expense of speed in proportion to the number of turns of the hoisting cable around the blocks. From this principle has been developed the differential chain hoist, usually hand-operated, and also used principally for temporary work or occasional jobs. Action is slow even with light loads, and becomes slower still as the loads increase in weight. Fields of usefulness are therefore severely restricted from a materials handling viewpoint.

3. *The Planetary Transmission.* By substituting in the block-and-tackle device a planetary gear transmission in place of the ordinary head block, power, speed and accuracy of movement are gained. In the spur-gearred chain hoist we find a great improvement over the differential hoist. When an electric motor was substituted for the

hand-pull chain the way was paved for the varied development of the electric hoist, in capacities ranging up to many tons. By mounting such a hoist on trolleys or on a crane, or at the end of a movable boom secured to a building column or the wall, horizontal movement is gained in addition to the vertical movements of the hoist itself.

4. *The Worm-and-Gear.* For the handling of loads heavier than may be safely picked up by the planetary transmission hoist, the worm-and-gear transmission paved the way for the development of the electric hoist in capacities ranging up to many hundreds of tons.

Thus three principles may be traced in the development of power hoisting equipment; the revolving drum, the planetary gear transmission and the worm-and-gear transmission. Except in the case of the mine-hoist, the elevator and the skip-hoist, such hoisting mechanisms are capable of movements in a horizontal as well as a vertical plane by suspending them from trolleys, cranes or movable booms.

5. *The Plunger.* Movement of a tightly fitting plunger in a hollow cylinder is responsible for the development of three devices of widespread use in the field of materials handling. The hydraulic plunger elevator is not as popular today as it once was, because it is slow in

action, although very steady and safe. The pneumatic hoist is widely used where compressed air is available as a factor in production. And the ram has become popular in two forms; to feed loose material in regular quantities intermittently, such as coal to a furnace fire, and to turn or shift parts at regular intervals to set them in proper position for the next process step.

An adaptation of the hydraulic plunger movement is to be found in the lift-truck; a hand operated device whereby the pumping action of a handle lifts the platform of the truck to pick up a skid-load of material from the floor so that it may be moved bodily to another location by the truck.

6. *The Rack-and-Pinion.* Developments of this principle are found mostly in industrial truck operation. On certain power operated trucks a lifting section may be rack-and-pinion moved to lift a load from the floor for transfer by the truck to another location. Or, in a hand truck a similar device, including a pawl and ratchet may serve the same purpose just described for the hydraulic lift truck. Lifting speeds are relatively slow in all these mechanisms, although it should be noted that the lifting operations are only secondary to the shifting operations of the trucks in which they are built.

At this point it is well to note that the reverse of a lifting movement may be carried out by any of these mechanisms, but that in

addition we have the force of gravity alone at our disposal. Goods may be lowered by gravity down smooth-faced chutes, either straight or spiral, or slid down over roller conveyors. Control as to direction is simple; control as to accurate spotting of material is difficult, in spite of various bumper and braking devices.

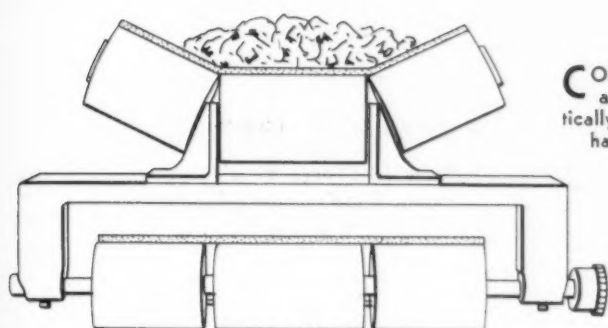
7. *The Wheeled Frame.* From the two-wheeled, two-handled hand truck, through the platform or box on three or four wheels, swivel-mounted or rigid, and the industrial railway to the industrial

Flat surfaced material, such as plates, rods, tubes, or coils, or material in boxes, bales or coils can be slid over these rollers by gravity, or certain rollers may be driven by power to draw the material along. A belt conveyor is simply an endless belt running over sets of rollers, making possible the movement of loose materials or small parts. Since belt conveyors give positive forward motion, however, their use is not limited to the transfer of small parts or loose materials. They are used in many places where the roller

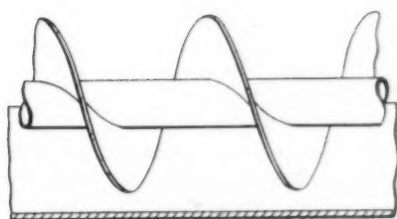
conveyor does not give sufficient positive movement. A bucket conveyor is an endless belt or chain running over rollers, with pockets or receptacles attached to pick up and move quantities of loose material, principally up a grade, or even in a vertical direction. Combinations of conveyor sections may be so installed as to change the direction of travel of the materials handled. Recent developments in design and construction of conveyors make these systems very flexible and adaptable to almost every handling operation in the industrial plant or warehouse.

9. *The Vibratory Conveyor.* Special note should be taken of the fact that certain materials must be handled at such high temperatures, or the materials may be so abrasive in nature, that ordinary conveyors cannot be used to handle them successfully. For such materials a vibratory conveyor system is now available, in which a somewhat flexible metal trough slowly advances a few inches, then quickly pulls back, at the same time flexing up and down. The vibratory movement, taken together with the inertia of the material, jerks it ahead, or even up a slight incline. Naturally, no attempt is made to use such a conveyor where an ordinary mech-

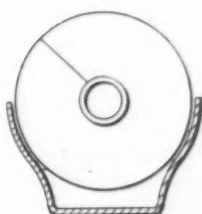
(CONTINUED ON PAGE 112)



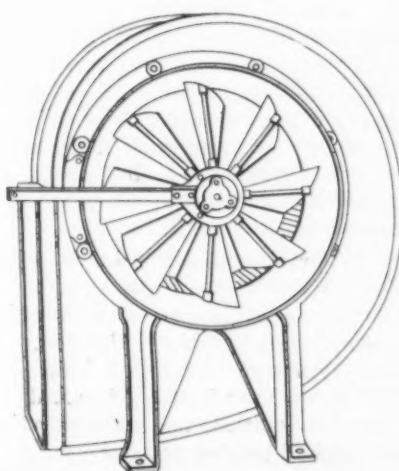
AT LEFT
CONVEYORS are adaptable to practically every materials handling problem.



THE screw is primarily a device for delivering at a certain rate of speed.

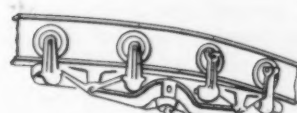


BELOW
THE fan is the basis for most suction and blowing systems of delivery.

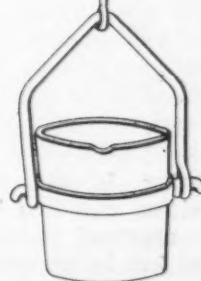


power truck and tractor train, the development of this principle has been progressive and logical. Means must be provided, however, for loading and unloading materials on any of these mechanisms, although in later types of trucks, special devices have been added to do these things also. There are almost infinite possibilities among the hundreds of types of mechanisms in this class of equipment now available. All require, obviously, clear floor or platform space for operation. Otherwise truck systems are extremely flexible.

8. *Conveyors.* In general there are three types of conveyors; roller, belt and bucket. A roller conveyor is simply a series of parallel rollers set in a longitudinal frame.



AT RIGHT
OVERHEAD trackage puts materials handling problems off the working floor.



HOW TO WELD TWENTY-NINE METALS

By CHARLES H. JENNINGS

*Engineer in Charge of Welding
Research, Westinghouse Electric
& Mfg. Co.*

THIS is the fifth article in an extensive series by Mr. Jennings. The first installment appeared in The Iron Age of Dec. 24, the second on Dec. 31, the third on Jan. 14, and the fourth on Jan. 21. Subsequent chapters will appear in ensuing issues.

o o o

Welding Processes

THERE are a number of methods of welding cast iron by the metallic arc process. The more important of these processes will be discussed separately in order to outline their essential differences.

Preheating is not necessary when welding cast iron by many of the approved metallic arc processes, but in general it will

be found advantageous. Preheating prevents the formation of stresses resulting from non-uniform heating, improves penetration, and reduces the hard areas adjacent to the weld, all of which tend to improve the quality of the weld and prevent cracks.

Proper preparation of the joint is necessary in all cases. Cracks should be properly prepared and cut out to insure a suitable welding surface. The wider the joint preparation, the greater is the fusion zone and the stronger the joint. Drilling at the end of a crack to prevent its extension is generally not necessary because the heat gradient of the casting should never be great enough to expand and extend it.

The first successful method of welding cast iron by the metallic process consisted of using bare electrodes and studs. The joint was properly prepared, then drilled, and steel studs inserted. The size, location, and number of the studs depended upon the joint

being repaired and the thickness of the material. The total area of the studs should be about $\frac{1}{4}$ to $\frac{1}{2}$ that of the casting and they should be long enough to extend through the first layer of deposited metal. The diameter of the studs should be about $\frac{1}{4}$ to $\frac{3}{8}$ in. The use of studding makes a mechanical joint on the casting. Good fusion between the steel studs and the deposited metal is possible and the bond to the casting is required only to make the joint pressure tight.

Joints of this type are not neat in appearance, but they have proved entirely satisfactory in service.

The next development in the use of steel metallic arc electrodes to weld cast iron consists of a steel electrode with a suitable flux coating. These electrodes have proved very satisfactory and produce joints stronger than the casting without preheating or studding. When using electrodes of this type, they should not be larger than

$\frac{1}{8}$ in. in diameter. The welding currents should be held as low as possible and only about 2 in. of weld deposited at a time. After depositing about 2 in. of weld, it should be peened lightly and the joint allowed to cool. Welds of this type are satisfactory except in cases where machining is required. The fusion zone is hard and so is the first layer. If more than one layer is deposited, the top layers may be easily machined.

Another method of welding cast iron is to use a copper electrode. These electrodes are of many varied types and in general contain coatings which are used primarily to stabilize the arc. Good fusion is obtained and joints having a strength equal to that of the parent metal are possible. Peening is generally found helpful. Preheating is not required. Welds made with copper electrodes are not machinable at the fusion zone and are of a different color than the parent metal. Electrodes larger than $\frac{1}{8}$ in. are often used in this process which means greater welding speeds. It is essential that the casting be kept cool, however, as in other processes.

In order to make machinable welds in cast iron, electrodes containing high percentages of nickel are generally used. As mentioned before, nickel promotes graphitization. That is why electrodes of this type will prevent the formation of chilled cast iron adjacent to the weld. These types of electrodes will produce good fusion and a deposit similar in appearance to the parent metal. The strength of such welds is generally lower than that of welds made with steel electrodes, but it is entirely adequate. The disadvantage of this type of electrode is its high cost. Because of this fact, it is not used unless machinability is essential.

Monel metal electrodes are of this type and are often used to make machinable welds on cast iron.

In addition to the previously mentioned electrodes, there has also been developed a coated cast-iron electrode which has certain special applications. This electrode deposits a cast iron deposit which is machinable when properly made. The proper technique of this electrode requires preheating and puddling long enough during welding to insure that the de-

posited metal does not cool below a red heat in less than 30 seconds.

This electrode is especially suited when building up large sections where preheating is possible, and where downhand welding can be used.

Aluminum

Aluminum is a silvery metal having a low specific gravity, a high thermal conductivity, and a relatively low melting temperature. On being heated, aluminum does not change in color or appearance until it approaches the melting point and then it suddenly collapses. When heated and exposed to the air, a film of oxide forms on the surface. This film has a melting point much higher than aluminum and does not form a fusible slag.

The physical properties of commercially pure aluminum and its alloys may be varied over a wide range by cold working, chemical composition, and heat treatment. Tensile properties ranging from 13,000 to 68,000 lb. sq. in. and ductility values ranging from nil to 35 per cent in 2 in. are obtained. The lowest ductility, however, is not necessarily obtained from the alloys with the highest tensile strength.

The fusion welding of aluminum is readily accomplished by the arc welding process providing the proper electrode and welding procedure are used. The physical properties of the resultant welds will be a function of the alloy welded, the composition of the electrode, and the subsequent heat treatment after welding.

The use of flux coated electrodes is essential for the satisfactory metallic arc welding of aluminum and its alloys. Electrodes of essentially pure aluminum can be used, but in general the most satisfactory results are obtained with an electrode containing about 5 per cent silicon. The 5 per cent silicon alloy has a lower melting temperature, a wider melting range, and a smaller solidification contraction than other aluminum alloys. These features, combined with its high strength, make it adaptable for parts held rigidly by clamps, joints that are apt to develop high contraction strains, and strong alloys that are more hot-short than pure aluminum.

One point that must be con-

sidered when welding aluminum and aluminum alloys with a 5 per cent silicon welding electrode is that the finished joint should not be heated above 940°F. This alloy is weak at this temperature and failure of the joint is possible.

No preparation of the plate edges is required for butt joints on plates $\frac{1}{8}$ in. or less in thickness. Materials thicker than $\frac{1}{8}$ in. should be beveled with a $\frac{1}{8}$ in. lip at the bottom of the joint and an included angle of 60 deg. For thin plates, $\frac{3}{16}$ in. and less, lap welding is generally preferred to butt welding.

Reverse polarity is used in the metallic arc welding of aluminum and the current values should be equal to, or greater than, those used on plain carbon steels. A short arc should be used and the welding speed approximately three times that used on steel welding.

Recommended electrode diameters for different plate thicknesses are shown in Table XL.

TABLE XL

Recommended Electrode Diameter for
Different Plate Thicknesses

Electrode Diameter (Inches)	Plate Thickness
$\frac{3}{16}$	up to 18 gage inc.
$\frac{1}{8}$	17 to 14 gage inc.
$\frac{5}{16}$	13 gage to $\frac{1}{8}$ in. inc.
$\frac{3}{8}$	$\frac{7}{8}$ to $\frac{1}{4}$ in. inc.
$\frac{1}{4}$	above $\frac{1}{4}$ in.

Preheating is not required on thin parts, but it will be found helpful in obtaining good fusion on heavy plates. If high currents are used in an effort to obtain fusion, excessive spatter may be encountered. Preheating permits the use of lower welding currents thereby reducing the amount of spatter and subsequent cleaning.

The slag should be thoroughly cleaned from all beads of deposited metal before restriking the arc and before depositing a second layer. After welding, the slag should be removed completely. Most of the slag may be easily knocked off. What slag does not come off in this manner may be completely removed by dipping the joint in a 5 to 10 per cent solution of sulphuric acid or nitric acid for several minutes. The slag deposited from some electrodes may be washed off with warm water.

The high coefficient of expansion of aluminum and its alloys makes the use of fixtures and bracing essential to prevent distortion and buckling. Also, the fact that aluminum melts suddenly and without warning when heated to the melting temperature makes the use of back-up bars very desirable whenever possible. Copper is generally used for this purpose.

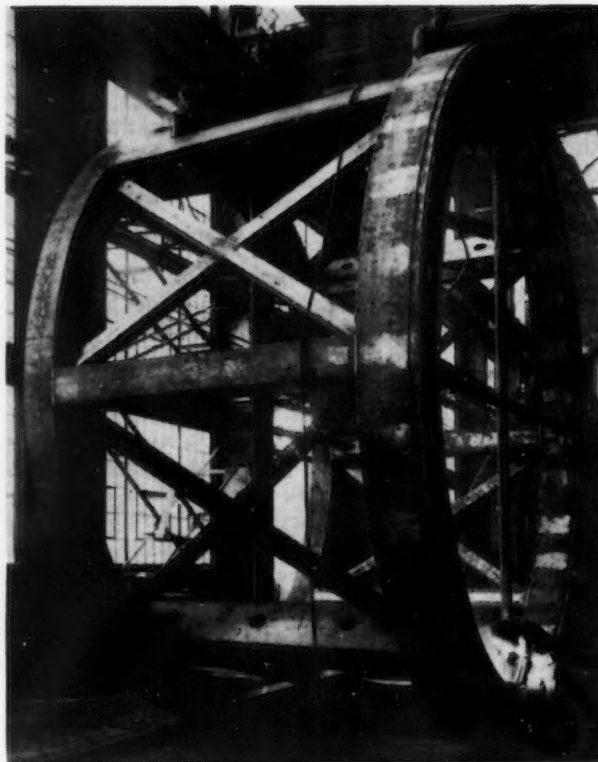
The tensile strength of aluminum and its alloys is determined primarily by the cold working and the heat treatment the parts have obtained. The heat of welding anneals the base metal adjacent to the joint. As a result, the parent metal adjacent to the weld will be the weakest part of the joint and the tensile strength will only be equal to that of the annealed base material. Heat-treatable alloy castings can often be heat-treated after welding and the resultant welds will have properties comparable to that of the base material.

According to the Aluminum Company of America. . . "The carbon arc can be successfully adapted to certain types of joints in aluminum. This method, however, is not as flexible in its application as metallic arc welding. The use of the carbon arc for welding aluminum at present is confined to butt joints, either straight or corner, and the similar types of lap joints. In this type of welding a flux-coated filler rod is inserted between the joint to be welded and the carbon electrode. The welding heat is then transmitted through the rod to the edges of the joint, and the flux, becoming molten, will remove the oxide film with which it comes in contact, allowing the parent metal and filler material to fuse together.

"This method of arc welding is particularly well adapted to butt joints in light gage metal (from 20 to 14 B. & S. Gage)."

Copper

Commercial copper is prepared in two grades: electrolytic and deoxidized copper. The essential difference between them is that deoxidized copper is free of oxygen while electrolytic copper contains from 0.3 to 0.7 per cent oxygen. The strength of commercially pure copper will vary depending upon the degree of cold working,



WELDING on a section of the prime focus cage for a 200 in. telescope. This section is 12 ft. high and 22 ft. in diameter. Coated electrode welding is used throughout.

and will range from 20,000 lb. sq. in. for annealed copper up to 60,000 lb. sq. in. for cold-drawn copper. The strength of an arc-welded joint will seldom equal that of the original base metal because some annealing action will take place during welding.

Copper has high thermal expansion, high heat conductivity, and low electrical resistance. In addition, when it is molten or heated above 1680°F. for more than a few seconds, there will be formed accumulations of cuprous oxide at the grain boundaries which greatly weaken the metal. A successful procedure for welding copper must take into consideration all of these factors.

The carbon arc process employing a phosphorus-bronze filler rod produces the most successful results for welding copper. No coating on the rod or flux is required. The success of this process is dependent upon high welding speeds to prevent the formation of cuprous oxide, the use of a long arc to prevent the filler metal and molten copper from dissolving gas and becoming porous from exposure to the oxygen of the air and carbon monoxide, and the low melting point of the filler metal.

Several types of phosphorus-bronze filler rods may be used, but

the most satisfactory results are obtained from one containing about 10 per cent tin, about 0.3 per cent phosphorus, and the remainder copper. Welds made with the filler rod will have a tensile strength of 30,000 lb. sq. in. and sufficient ductility to withstand a flatback bend test.

Plates to be butt-welded should be beveled if they are over 3/16 in. thick to an angle of sufficient width to allow complete penetration. Recommended angles of bevel are 45 deg. for 1/4-in. plates, 52 deg. for 3/8-in. plates, and 60 deg. for 1/2-in. plates. (These bevels correspond to included angles of 90 deg., 104 deg., and 120 deg. respectively). Even when making lap joints it is desirable to bevel the plate edge to increase the ordinary 90-deg. angle to about 135 deg.

Whenever possible, the joints should be backed up with steel or heavy copper backing bars to prevent the molten metal at the bottom of the joint from falling away.

The diameter of the filler rod used should be sufficient to fill and reinforce the joint in a single pass.

The welding process is carried out as follows:

(1) The end of the rod should be laid in the groove and the arc

struck on the rod and not the plate. Striking the arc in this manner causes the end of the rod to melt and deposit a pool of bronze on the copper thereby protecting it from the deposit of carbon that results when striking an arc with a carbon electrode on a cold plate. After the arc has been maintained on this pool for a short time to pre-heat the copper to the required temperature, the bronze will spread out and tin the copper and the welding can be continued along the seam. A high enough welding current should be used to obtain tinning of the copper by the initial pool of bronze in about five seconds.

(2) A long arc corresponding to an arc voltage of 35 to 45 volts should be held.

(3) Recommended welding currents and filler rod diameters for welding copper are given in Table XLI.

(4) The welding speed should be fast. Speeds slower than 10 in. per minute will produce porous welds and oxide inclusions in the fusion zone when welding electrolytic copper.

(5) The filler rod should be held at a slight angle above the surface of the plates with the end down in the bottom of the groove. This prevents the molten metal from running ahead on the cold plate.

(6) Plates over $\frac{3}{8}$ in. thick should be preheated to a dull red heat.

(7) Vertical and overhead welding are not possible by this process.

Physical properties of welds made on electrolytic copper having a tensile strength of 33,000 lb. sq.

TABLE XLI				
Filler Rod Diameters and Current Values for the "Carbon Arc" Welding of Copper				
Copper Thickness		Carbon	Filler Rod	Welding
U. S. Gage	(Inches)	Size (Inches)	Diameter (Inches)	Current (Amperes)
18	1/20	3/16	3/32	120-160
17	6/160	3/16	3/32	130-180
16	1/16	3/16	1/8	140-190
15	9/128	3/16	1/8	150-200
14	5/64	1/4	5/32	195-260
13	3/32	1/4	5/32	200-270
12	7/64	1/4	5/32	210-280
11	1/8	1/4	3/16	225-300
9	5/32	1/4	3/16	250-330
7	3/16	1/4	3/16	280-370
5	7/32	5/16	1/4	300-400
3	1/4	5/16	1/4	315-430
..	5/16	5/16	5/16	340-450
..	3/8	5/16	5/16	370-470
..	7/16	3/8	3/8	400-500
..	1/2	3/8	3/8	420-550

in. will develop tensile strengths of 30,000 lb. sq. in. Welds made on deoxidized copper will develop tensile strength of 30,000 to 32,000 lb. sq. in. The ductility in both cases will be good.

Within recent years, shielded-arc phosphorus bronze electrodes have been developed that will produce satisfactory welds on copper. The fact that the welding current used in metallic arc welding is dependent upon the diameter of electrodes makes this type of welding unsatisfactory for welding heavy plates because sufficient heat cannot be developed to produce fusion. Very satisfactory results can be obtained on plates $\frac{1}{4}$ in. thick or less, however.

Reverse polarity is used with

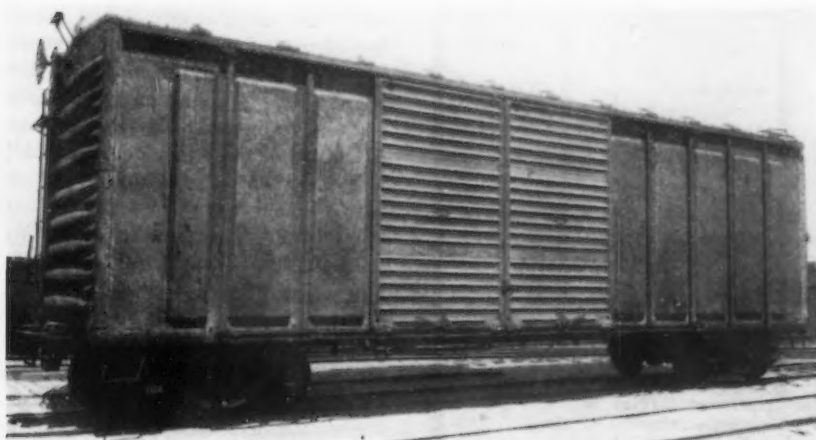
coated phosphorus bronze electrodes and a short arc is recommended to obtain good fusion and prevent excessive spatter.

Sound welds of high strength can be obtained on copper by the metallic arc process, but the ductility is slightly less than that obtained with the carbon arc process.

Welding Copper to Steel

Copper can be successfully welded to steel by both the carbon arc and metallic arc processes when using phosphorus-bronze electrodes. The metallic arc process is the most satisfactory for copper plates $\frac{1}{4}$ in. or less in thickness. For plates over $\frac{1}{4}$ in. in thickness, the carbon arc process should be used.

(TO BE CONCLUDED)



A RC-WELDED freight car made with a low-alloy, high-strength steel.

WHEN this series is completed, the articles will be reprinted by the Westinghouse Electric & Mfg. Co. and anyone desiring copies of the booklet may obtain them from Westinghouse distributors or direct from the welding sales section at east Pittsburgh, Pa.

By A. H. RODRICK

WATCHMAN!



IN this age of progressive management more thought should be given to the importance of the work being performed by certain employees, and their rightful place in the organization, if maximum results are to be obtained. It is a short-sighted policy to look upon anything as too small to deserve study. To consider a job so unskilled as not to warrant an estimate of its worth is a managerial step backward rather than forward. The railroad walker who

taps with a hammer the wheels of a train when it stops at a station, has a responsibility comparable in part to that of the engineer. And yet, the simplicity of the work does not imply the seriousness of his task.

In an industrial plant the same is true of what was once considered the least important duty of all—the night watchman. His job though not yet dignified is clothed with the responsibility of protecting property at least 50 per cent of the day in order that the entire

force may have a place to work and equipment to work with when they return in the morning. While the executives, office force, and skilled workers sleep he is awake, and his working hours are attended by the fears always present at night. The functions of this employee should appear on the organization chart as safeguarding the empty factory against fire—that danger that never sleeps—and waste, and the position is not one to be properly entrusted to an old man with a lantern unless he is physically and mentally qualified to understand fully what will be required of him. He should be selected on the same scientific basis as other employees, and trained and instructed in a like manner.

It is said that fire losses increase about 35 per cent after the closing time of industrial plants. An alert watchman, therefore, making regular rounds, can detect any condition which, if allowed to remain, would probably result in fire.

Spontaneous Combustion

Spontaneous combustion is one of the most frequent causes of fires, and this condition is just as likely to occur during the night as in the day. A surprisingly large number of materials that are commonly present in factories may take fire without the application of a flame or heat from an external source. Among them are: bituminous coal, and sawdust; oily rags, and cotton waste that have been used by painters or for cleaning machines; linseed oil, turpentine, and varnish; and metallic powders of various kinds. Combustible material of any kind should not be allowed to lie about, especially when leaving the shops at night. Rags used by painters should not be exposed to heat, and cotton waste moistened with linseed oil should not be allowed to stand in contact with the air. Such

WATCHMAN'S LOG

Name	Date
Tour	Condition
6 to 7	Lathe LA9 in Assembly Shop Running
8 to 9	Roof in N. W. Corner of Court Leaking
10 to 11	All Secure
12 to 1	Water Pipe in Tool Room 3rd Floor Leaking (Shut off Water)
2 to 3	All Secure
4 to 5	Small Fire in Doe's Mill
6	Checked Out

NOTE: To be submitted in duplicate to the Plant Engineer's Office before checking out. Where action is required one copy is returned to the watchman upon reporting for duty.

What of The Night?

materials should always be stored in approved metal cans with self-closing covers. Workmen are apt to leave oily overalls and jumpers in their lockers, and for this reason steel lockers should be provided as they will confine a fire in case one starts. Since rubbish heaps are always fire hazards, all trash should be removed from the plant once a day, and men so detailed should be required to see that refuse cans are put in the designated places outside for trash trucks. If smoking is allowed it should obviously be confined to less dangerous places, and never permitted anywhere after one hour before closing time. This affords an opportunity to discover any smoldering fire that may be in existence prior to the time the buildings are vacated, since such a fire from this cause is likely to manifest itself within one hour. All persons smoking should be required to deposit the cigarette, cigar, or pipe remains in a metal cuspidor or receptacle filled with water. Sand as a filler for these receptacles should not be used. It is a fire preventive but with cigarettes particularly the stub continues to burn, and the air soon becomes foul from the escaping smoke. If water is used both the fire and smoke are at once extinguished. It is the presence of these and similar conditions that may cause a fire after working hours, and the efficient watchman will be on the lookout for them as he patrols the buildings.

How to Fight a Fire

The watchman should, however, be instructed further than merely to detect fire hazards. He must be taught how to fight a fire, and how to use properly first-aid fire equipment. "A bad fire is almost invariably the uncontrollable adult form of what was once an easily controllable infant," and "a glass

of water might be sufficient if the fire be discovered early enough." The importance of fighting a fire vigorously and intelligently in its inception cannot be over-emphasized.

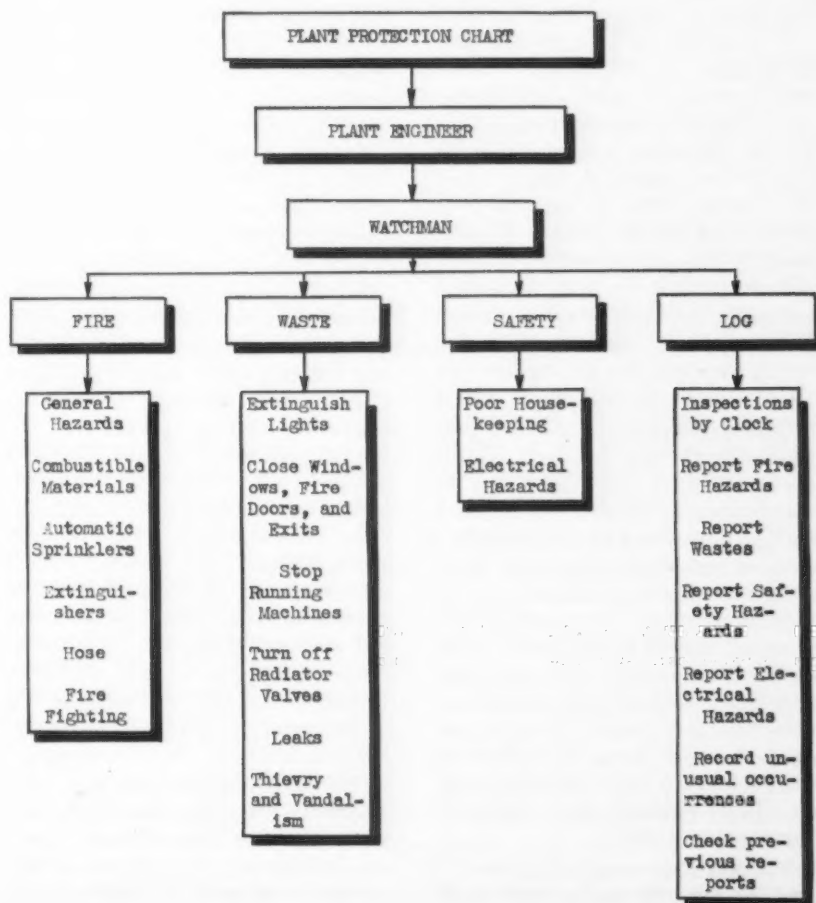
In fighting a fire the fire itself should be attacked rather than the flame, and the stream from extinguishers and hose should be directed not to the flame but to the place from which the flame comes.

Knowing the right type of extinguisher to use in an emergency is very important to avoid disastrous consequences. The soda-acid or foam types, because of their

quenching and cooling effect, should be used on incipient fires occurring in wood, paper, textiles, animal and vegetable fibers generally, coal, coke, starch, sugar, cereals, bitumen, asphalts, waxes that do not melt readily under heat, photographic, X-ray, and motion picture film and proxylin products generally.

For oil fires, including gasoline, kerosene, alcohol, and turpentine, as well as those in paints, varnishes, and lacquers, the carbon-tetrachloride type should be used because of its blanketing effect.

For electrical fires, including those in insulation of motors,



generators, transformers, switchboards, and electrical wiring generally, the carbon-dioxide type should be used because its stream is a non-conductor.

The electrical hazard in fire extinguishing is not so generally understood. Discharging streams from hand extinguishers on electrically charged objects may present a very serious hazard. When using a hand extinguisher the fire must be approached quite closely in order to direct the stream effectively. Because of this the extinguishing solution is likely to be in the form of a continuous solid stream. If it were possible for the user to stand at a considerable distance from the fire, the stream would break up in a sort of spray, and the air spaces between the various sections of the stream would prevent the free passage of the electric current. The proper extinguishing solution to use on such fires is therefore very important. Under ordinary conditions water is a more or less effective conductor of electricity, and the addition of calcium chloride or other mineral substance does not reduce the conductivity, but usually increases it. Soda-and-acid solutions, as well as substances which produce foam, are electrical conductors. Carbon dioxide is not only a non-conductor but it dissipates quickly and does no damage to the equipment. With fires of this character all possible care should be exercised regardless of the potential of voltage; the higher the potential, the greater the caution. The obvious thing to do is to cut off the current immediately, if there is a circuit breaker or switch near by. It is always advisable to disconnect all current at night except such as is needed for lights, elevators, and fire pumps.

In addition, the watchman should be instructed in the use of fire hose which, in all well-managed plants, is attached to fire hydrants or stand-pipes and neatly folded on a rack so that it can be quickly pulled without tangling. On each floor of a building there should be, at each of the four corners, a hydrant to which should be attached a hose sufficient in length to reach a possible fire in any part of that particular floor. Instruction in the use of both hose and extinguishers should include an actual discharging of each at some convenient place outside the building.

To facilitate quick location of extinguishers in an emergency, it

is well to paint a wide red band around the pillar or on the wall to which one is attached, and to designate the kinds a narrow strip of different color should be painted above it. For example, yellow for the soda-acid and foam types; blue or a like color, for the tetrachloride; and green, for the carbon-dioxide.

Sprinkler Systems

If an automatic sprinkler system is installed, the watchman should thoroughly understand the operation of all the valves and know how to shut off the water should a valve open when there is no fire. If a fire breaks out which gets beyond his first-aid equipment he must know how to give the alarm to the city fire department, understand the throwing of switches to start the fire pumps, and then proceed to protect the equipment and material as much as is safely possible by covering it with tarpaulins or other like material to lessen the water damage.

It is possible for an incipient fire at night to gain such headway as to destroy a plant before being discovered by somebody not connected with the company. One such fire may cost many times the yearly pay of a watchman.

The watchman is also the plant protector against waste—that gradual wearing away of capital investment—which may occur at night as well as during the day. He should, therefore, make a complete round and thorough inspection of the entire plant immediately after closing time, observing then any waste that may exist. For example, all lights, except standing ones, should be extinguished; windows, fire doors, and exits closed; radiator valves turned off, unless necessary to stay on to prevent freezing; and dripping spigots shut off. He should also note gas and oil leaks; leaking water or steam pipes, and air hose; leaks in roofs; gas fires left burning; and machines left running. It is obvious that he should be on the lookout for the thief who would pilfer or the vandal who would destroy. The elimination of these, as well as other, consequential wastes over a period of one year may more than pay his annual wage.

The watchman is also the night inspector of safety. He should correct any poor-housekeeping condition left by the workers which constitutes a hazard, or might inter-

fere with his free movement in fighting an incipient fire or that of the city fire department if called into action. However, electrical, or like, unsafe conditions found existing should be reported in the manner to be described, but no steps should be taken at the time to rectify them because of the potential danger. A watchman, patrolling his post during the night, came into contact with a wire dangling from the corner of a building. He grasped the wire to push it out of the way, whereupon there occurred a severe flash of such intensity as to cause temporary blindness and injury to his eyes, later diagnosed as retinitis. Investigation developed that the wire was connected to an unprotected switch installed on the corner of the building and used for power for a large lifting magnet, and that several small wires of about No. 14 gage were hanging from a loosely and carelessly made connection to the upper fuse-post clips of this switch. The switch was closed. Apparently, in moving the wire, the watchman had caused it to short circuit with the small loose wires dangling from the opposite fuse post.

Watchman's Duties

The watchman should make his rounds of the entire plant at stated and regular periods, punch a clock, and the time slip should be checked by the plant engineer the next morning. He should also keep a log noting thereon anything irregular observed or occurring. If a fire hazard, like those described, has been left by the workers it should be reported. If a waste or an unsafe condition is found, it too, should be entered. Should any unusual event transpire, such as a disgruntled employee returning in an intoxicated condition and threatening a supervisor, or the appearance of thievish suspects, it should be noted. Even a fire in close proximity to the factory should be mentioned in order that study might be given to a possible exterior fire hazard. On the following morning, all log entries should be investigated by the plant engineer, and the necessary steps taken to correct those conditions that need correcting. When the watchman reports for duty that evening he should be furnished with a copy of the action ordered on each of his previous entries, and on his first inspection of the plant he should check up items, noting his findings.

DIE FORGED LOCOMOTIVE RODS

TWICE for every revolution of the driving wheels of a locomotive, the reciprocating parts—comprising the piston, piston rod, crosshead and front half of the main rod—must move the length of the piston stroke. This means that at 100 miles per hr., a mass almost equal in weight to an ordinary automobile must be started and stopped 12 times every second. This mass of course must be counterbalanced for otherwise the hammer blows developed at the higher speeds would destroy the track. A recent development of specially designed forged alloy rods equipped with roller bearings has greatly reduced this reciprocating weight thus making it possible to increase train speeds as much as 40 miles per hr. in some instances before developing hammer blows equal to those existing at the lower speeds for the plain rods. This article not only describes the design of these rods but also considers the forging practice and the metallurgical requirements solved during manufacture.

□ □ □



DIE forged main and side rods of chrome-nickel - molybdenum steel, heat treated to secure the best physical properties and operating on tapered roller bearings, are giving new speeds to modern steam locomotives. These rods, produced by the Timken Roller Bearing Co. and made from high dynamic steel, are being made at the plant of the Park Drop Forge Co., Cleveland.

Perfecting the application of heat-treated die-forged rods required years of research and experimental work; for before they

could be used successfully, the application of anti-friction bearings to crank pins and crossheads had to be perfected. This complex problem was finally solved and made possible a saving in weight of over a thousand pounds in the reciprocating parts as compared with construction using the usual rods machined from carbon steel slabs.

Fig. 1 illustrates the rod arrangement and power split-up, which is radically different from the conventional pattern. It will be noted that the knuckle pin is eliminated, reducing the main crank pin loading 55.5 per cent as compared

to the standard plain bearing design with its wide bearing areas and large rods. In the Timken design the piston thrust is transmitted through the main rod to the outside diameter of the bearing cup which floats between the bearing and the hard bronze bushings in the rods. Piston thrust is split three ways, one-third going through the bearing to the main wheel, one-third direct to the rear wheel and one-third to the front wheel in the case of a standard locomotive with three driving axles. With a full piston thrust of 120,000 lb., this new design gives a loading of only 89,000 lb. on the main pin, while with the standard design the loading would be 200,000 lb.

Rod eyes bear directly on the main bearing cup, which in the case of the main pin serves the double function of knuckle pin and crank pin in distributing the piston thrust from the main rod to the front and rear drivers. A spacer is provided between the front rod, which is nearest the wheel, and the main rod, allowing No. 1 driver to be dropped without disturbing the main rod or bearing. Clearance is provided between adjoining surfaces to allow for lateral and

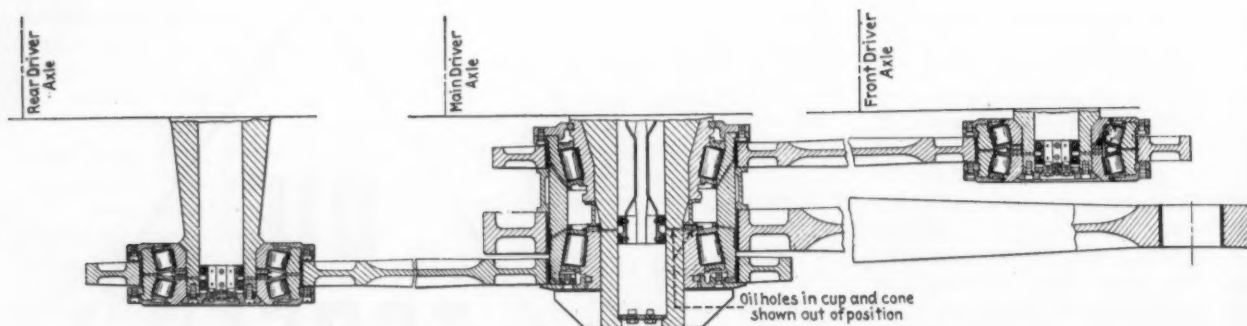


FIG. 1—The rod arrangement is radically different for the alloy rod with roller bearings, as compared with the conventional pattern for a plain rod.

angular movement of the rods on the pin, which is further facilitated by the taper in the width of the rod.

In the case of both front and rear pins, the bearings consist of two sets of tapered rollers running on separate cones, with a single cup. Bearing and mounting parts for the front and rear crank pins are identical and interchangeable. The rear crank pin is essentially a second main pin, as its extended position relieves the main pin of bending loads due to piston thrust. To reduce weight and at the same time provide a reservoir for lubricating oil for the bearings on the rods, all crank pins are hollow bored.

No Localized Stress

Two years of research, over 6000 laboratory tests on rod eye design

and almost as many more on column sections were required before the first die forged set of locomotive rods went into service. These tests were necessary to determine the most effective distribution of metal to avoid high stress concentrations. The final approved design was based on an I-section column with round ends modified to some extent by flat column design. The ends of the column section are tapered according to Dinnik's formula so that in the tapered section the moment of inertia varies from the body section to the eye section in the ratio of the cube. Full piston thrust applied as a column load and approximately half as much for the side rods.

Particular care was exercised in designing the eye section on all rods

to avoid the possibility of localized stresses either around the eye or in the section where the eye blends into the column section. Formerly the severe lateral bending due to the high eccentric loading encountered in plain bearing design caused rod failures where the eye merges into the body section. In the forged rods the design is such that as the lateral width decreases the vertical depth increases throughout the critical section, uniform stressing being maintained throughout.

Length between centers varies according to locomotive design, but the column section of all main rods is 7½ in. deep by 4¼ in. wide, the flanges being 13/16 in. thick and the web ¾ in. At the bearings the width is only 3 in., but section area and stressing is maintained constantly by increasing the depth and

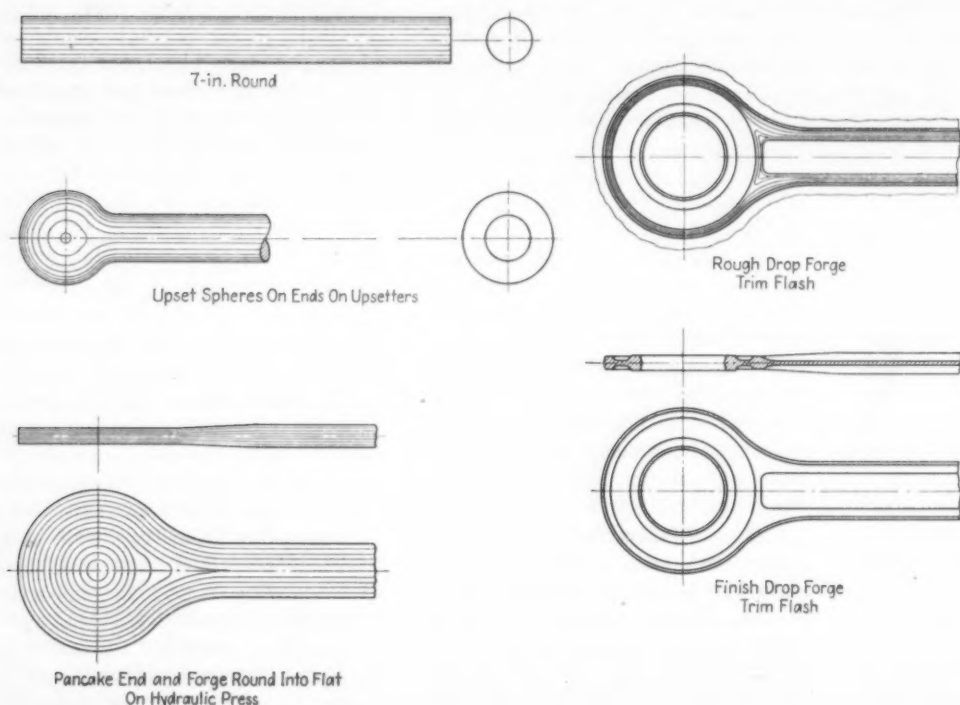


FIG. 2—The four major steps in the forging of an alloy rod.

thickening the flange. This practice is also followed in the case of side rod design, as will be seen from the several photographs. In these units the column section is $7\frac{1}{2}$ in. deep by 3 in. wide with a $\frac{1}{4}$ in. web, tapering to $1\frac{1}{8}$ in. wide at the eyes with compensating increases in depth to maintain the desired uniform section. Full sized

chining must be held to an absolute minimum. A working tolerance for the forging operation of less than $\frac{1}{4}$ in. is permitted between eye centers. Such a tolerance in 10 or 12 ft. requires precision work from the start to the finish. As completed, the forging carries about $\frac{1}{8}$ in. of metal to allow for finish machining.

After forging the pancake on the end of the billet, the piece goes back to the furnace, where it is soaked to bring it to a uniform temperature of approximately 2000 deg. F.

The third operation is blocking, which is done in a set of heavy dies on a 1500-ton hydraulic press. Here the pancake is squeezed into form,

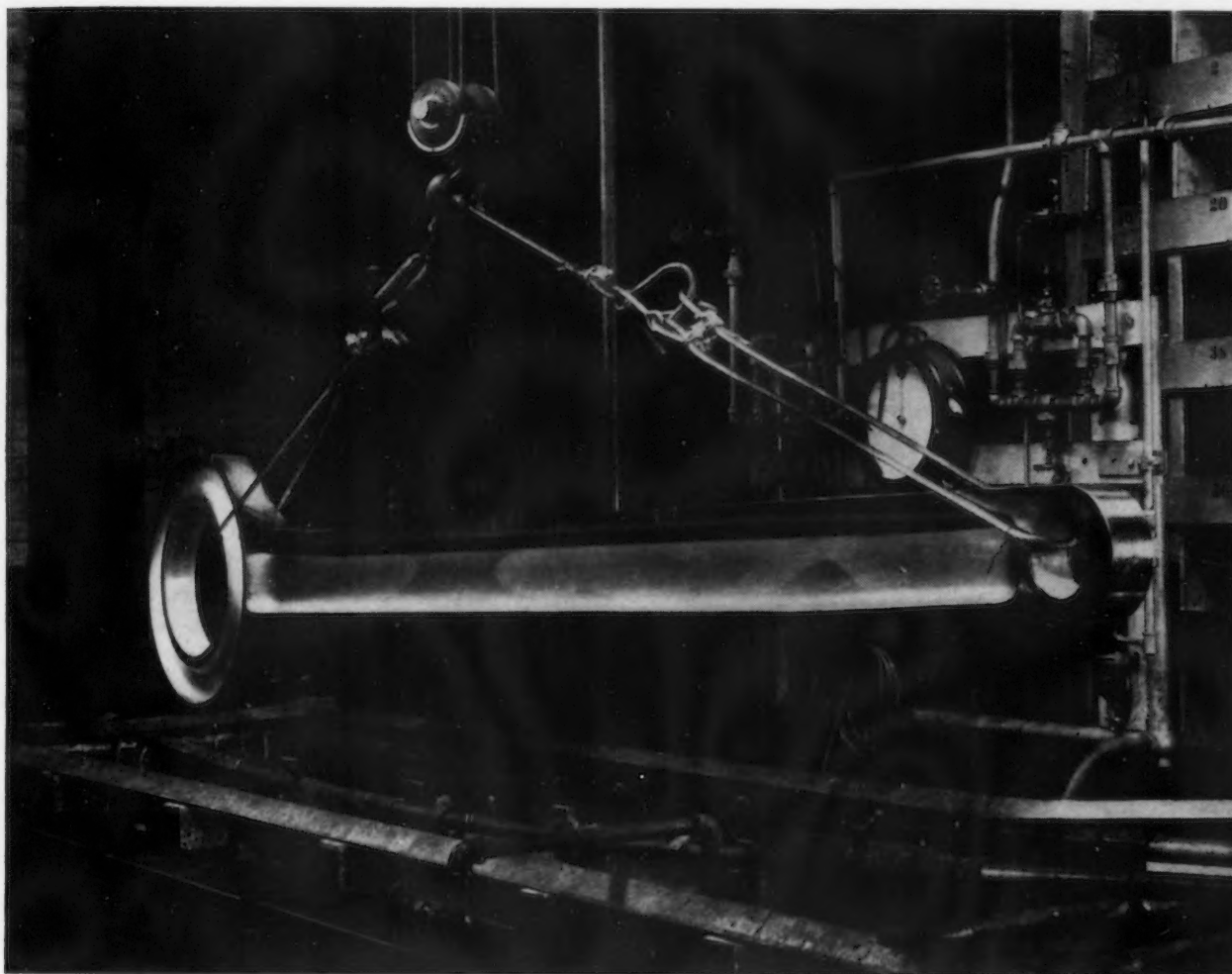


FIG. 4—Forged main and side rods are chrome plated in this special tank. This is one of the largest single pieces ever to be so plated.

o o o

specimens were used in the test program, gage points being located at 15 deg. intervals all around the eyes.

Special forging practice was developed by the Park Drop Forge Co. to make sure that the grain flow would be continuous around the rod eyes, avoiding the possibility of weakening due to cross-grain structure. Remarkable success has been achieved in securing this desirable condition. Fig. 2 illustrates the several steps in forging one of these new type rods.

Careful calculation is required before work is commenced; for ma-

Work begins on a 7-in. round hot-rolled billet, heated with extreme care to avoid possible ruptures. The stock is first gathered into a sphere on one end (see Fig. 2). This is done in a heavy upsetter and particular care is exercised to insure smooth, even grain flow. The next step is to flatten or "pancake" the sphere. This is done under a heavy forging hammer, reheating the piece as often as necessary to maintain an even working of the metal.

the grain flow unified and the blank made ready for finish forging. The blocking dies leave a thin plate in the bore of the eye, which is trimmed out before sending the blanks to the finishing hammer. The outer flash is allowed to remain in place during the first stage of the finish forging.

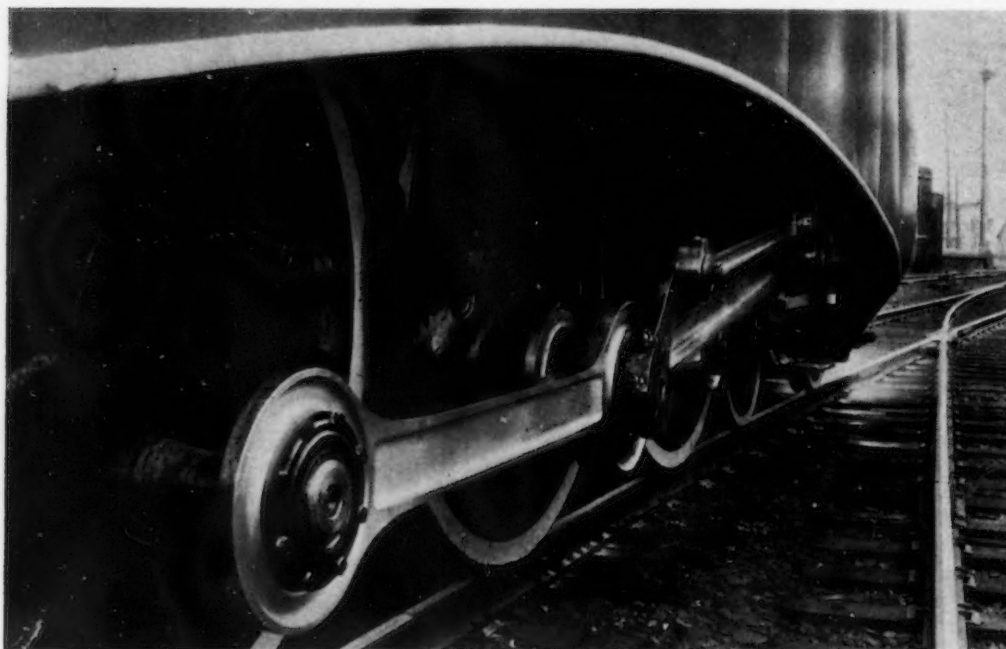
Finish forging is done on a special 18,000-lb. drop hammer, never allowing the temperature of the piece to fall below 1800 deg. F. During the forging operation every precaution is used to assure a smooth, well worked piece. After each blow of the hammer, scale is

removed from the dies and work by means of a steam jet to avoid the possibility of scale marking. The forging dies are cut in heavy forged steel die blocks heat treated to 302 Brinell before machining. Each die carries an exact impression of a rod eye and part of the column section. This die construction is done by the Park Drop Forge Co. in their own shops on the latest type of hydraulic milling machines.

a locomotive are the same, so on an order for forged rods for a locomotive having three driving axles the same dies are used for the four side rods. Main rods also require a set of dies for each end, the large or crank pin end set being similar to those used for the side rods and a second and smaller set being required for forging the crosshead or small end of the rod. After both ends of the rods are forged, the

perature control held to ± 5 F deg. Four thermocouples in the furnaces, connected with recording pyrometers, assure uniform heating over the entire length of the rods and furnish a definite record for shop examination.

Quenching is done in a specially built vertical tank to prevent warping. This tank is adjacent to the furnace and special handling equipment has been installed to facilitate



THESE are the parts which send the New York Central's high-speed streamlined passenger locomotive Commodore Vanderbilt over the rails. Specially designed and forged alloy main and side rods, alloy piston rod and piston and the use of roller bearings have effected a 52 per cent reduction in weight of reciprocating parts and a 22 per cent reduction in weight on the main pin.

Both the blocking and finishing die sets are made to include slightly more than half the length of the column section of the rod, thus reducing the die changes to a minimum and permitting considerable range in rod lengths. Trim is held to a minimum, three operations only being required. The first takes out the thin center section after the blocking operation, the second removes the flash after finish forging is about half completed, and the last trimming cleans the piece when forging is complete. The metal is so evenly distributed and the operations have been perfected to a point where now only a few pounds of steel are trimmed from each end of a side rod.

Trim Is Slight

When one end of a rod is complete, the operation schedule is repeated on the other end. Although both ends of a side rod are similar, different dies are required for each end. However, all the side rods on

column section is passed through a finishing center-die to straighten it and line up the ends.

Controlled grain flow complicates manufacture, but as it adds greatly to the strength of the parts, the manufacturing difficulties have had to be solved. One of the major problems encountered was how to forge a rod to tolerances sufficiently close that flow lines would not be cut during subsequent machining operations. This difficulty was overcome by proper die construction and advanced forging practice, and the Park Drop Forge Co. actually works to a tolerance of approximately $\frac{1}{8}$ in. As a result, the maximum value of controlled grain flow is attained and the uniform stressing which is an integral part of the design is assured.

After forging operations are complete, all rods are normalized, quenched and drawn to a minimum hardness of 275 Brinell. All heat-treating operations are done in oil-fired furnaces under automatic tem-

operations and give the close control of temperatures which is so essential in work of this character. After the heat treating operations are complete each rod is pickled and inspected. Each rod is Brinelled over its entire length, tests being made at least every 12 in., including the eyes as well as the column section. To pass inspection, all Brinell readings must be within 20 points. A subsequent Magniflux test is made to give definite assurance that these forged rods are free from any hidden defects. Control pieces of similar dimensions are heat treated with every rod to furnish specimens for metallurgical and physical examination.

Tests indicate the following comparison of properties between the carbon steel formerly used for locomotive rods and the Timken chromium-nickel-molybdenum steels used in these new forged and heat treated rods: Elastic limit of 110,000 lb. per sq. in. for the Timken steel, compared with 35,000 lb. per sq. in.

for carbon steel; yield point of 115,000, compared with 39,000; ultimate strength of 143,000 lb. per sq. in. compared with 83,000; elongation of 2 in. of 25 per cent for the Timken, compared with 32 per cent for the plain; reduction in area of 55 per cent, compared with 65.9 per cent; and a Brinell hardness of 275 for the Timken, compared with 136 for the plain steel previously used.

An analysis of Timken high-dynamic steel shows it to be made up of 0.36 C, 0.70 Mn, 0.015 P, 0.013 S,

tests showing 6700 lb. per sq. in. at the bore and 4100 lb. per sq. in. at the outer edge. To determine the effect of rod bushing wear, similar tests were made with the pin fitted 5/64 in. loose. Stresses increased between 30 and 50 per cent over those existing when the pin had its normal fit of 1/64 in. loose.

At the small, or crosshead, end of the main rod a press fit of 0.004 in. showed tensile stresses at right angles to the center line of the rod of 9700 lb. per sq. in. at the outside and 21,800 lb. per sq. in. at

120 miles per hr. before the dynamic augment or hammer blow equals that which was formerly developed at 80 miles per hr.

To improve the appearance of these new forged main and side rods and to preserve them from rust and atmospheric attack, several have been chrome plated at the Timken plant, one being shown in Fig. 4. Special equipment was required for this operation and it is believed that a locomotive main rod represents the largest single piece ever chrome plated as a unit.



LIGHT-WEIGHT forged main and side rods for the world's first streamlined high-powered steam locomotive. Timken bearings are used on crosshead pin and all crank pins. The new alloy reciprocating parts weigh 941 lb. as compared with 1971 lb. for standard construction.



0.27 Si, 0.75 Cr, 1.75 Ni and 0.25 Mo.

Analysis of the physical load tests made on full-sized eye sections as shown in Fig. 3 shows that an area is under compression at the bore at both ends of the eye. Next to the shank the compression area extends 45 deg. each way, the neutral axis forming an ellipse crossing the center line of the rod near the middle of the web in the column section. At the opposite end this compression area extends 30 deg. each way from the center line, penetrating about $\frac{3}{4}$ in. into the inner flange. With a load of 58,000 lb., the pin in the bore being fitted 1/64 in. loose to conform to standard clearance conditions when the rod bushing is new, compression at the shank end of the eye was 12,500 lb. per sq. in. and at the opposite side 2655 lb. per sq. in. Maximum tension exists at right angles to the center line of the rod and amounted to 23,500 lb. per sq. in. at the bore. Midway between these maximum points no bending stresses exist and the eye section is in pure tension,

the bore with 6300 to 20,900 lb. per sq. in. at the end, under an applied load of 117,400 lb.

Although the forged main and side rods represent the most striking change from standard practice, substantial weight savings have also been made by machining the piston rod from cold drawn seamless tubing and forging the piston to a lighter section, thus utilizing the higher strength of the alloy steel and its improved properties gained from heat treatment. The same steel is used for these parts as is used in the forged rods.

In the case of one locomotive, weights on the main crank pin have been reduced 350 lb., and 1030 lb. of unnecessary weight eliminated in the reciprocating parts. This effects a reduction in crank pin load of 48,500 lb. when the locomotive is operated at 100 miles per hr. Similarly, a reduction of 66 per cent has been made in over-balance in each driving wheel. As a result, putting Timken rods, bearings, pistons and piston rods on this locomotive has made it possible to raise its speed to

Heat-treated die-forged rods have only been applied thus far to locomotives having three driving axles. Their success has been such that a number of roads are giving serious consideration to changing over existing equipment to take advantage of the increased speed and savings which are made possible by their use and it is anticipated that the coming year will see a rapid increase in the application of this new equipment. Practically all the specifications for steam locomotives on which bids are now being received call for roller bearings on all axles, including the driving axles, which indicates the trend toward increased efficiency and decreased operating costs. The steam locomotive is keeping abreast with progress, and important advances have been made in locomotive design and construction during recent years. Existing locomotives can be remodeled comparatively easily to include most of the improvements, and the railroads are replacing and modernizing their equipment as rapidly as possible.



WILLIAM E. KANE

Fifty Years of Successful Diversified Effort

o o o

THERE were no electric alarm clocks and no child labor laws in 1881. Perhaps that was the reason why people in those days got up earlier in the morning than they do now, and also why they went to work at an earlier age. Take the case of William E. Kane, for example. In 1881, at the age of 15, he opened a repair shop of his own at Baldwinsville, N. Y. This he operated after school hours and neighbors who liked the independence of the boy brought him lawn mowers to fix and skates and shears to sharpen.

This part-time dip into mechanics was so alluring that one year later, he abandoned school altogether in favor of employment at Heald &

Morris, the predecessors of Morris Machine Works. Working hours then were from seven in the morning until six at night, which did not leave much time for relaxation, but "W. E." managed to find time to study physics and geometry by arriving on the job an hour earlier and leaving for home an hour later.

Out of this thorough initiation into the elements of metal working Mr. Kane obtained the experience which in 1887 led him to establish his original company which four years later took the name of Kane & Roach. While the original company was entitled "the Monarch & Eureka Co.," it was actually the beginning of the Kane & Roach of today.

The modest little beginning in metal working was located in a small building in Syracuse. Here was made the first of a long series of Mr. Kane's inventions, namely a chemical filter for boilers. The business prospered almost from the start, and the little plant was kept busy filling orders for these chemical boiler filters and for a filter for domestic use, which was added to the line soon afterward.

Associated with Mr. Kane from the very start of the business as a salesman in his employ was his brother-in-law, Bartholomew F. Roach. In 1891, Mr. Roach was admitted to partnership and the firm of Kane & Roach continued until Mr. Roach's death in 1900. While

the Roach interest in the business terminated with the demise of the junior partner, Mr. Kane has continued the firm name as a tribute to the important contribution made by Mr. Roach.

Two years after the beginning of the business, larger quarters were leased and shortly afterward still more floor space was needed. In 1898, the company bought the site where its present plant is located and erected the first of a group of manufacturing and office buildings. At that time the carriage and wagon trade was flourishing and Mr. Kane saw the possibilities involved in serving this industry. One of his early inventions was a power hub-boring machine, many thousands of which were sold to makers of carriages and wagons.

Before the carriage trade had lost its bloom, Mr. Kane had a "hunch" concerning the future of the steel industry. Thus it was that only six years after the inception of the business, Kane & Roach placed on the market the first straightening machine of its kind to be sold commercially in this country.

Through the long span of half a century, Mr. Kane has designed and manufactured a line of machines as diversified as pumps, hydraulic presses, wheel drills, multiple punches, spoke drivers, band saws, jointers, planers, and drill presses. All of these, how-

If one were asked to point out a typical American metal-working concern, he would hardly choose one of our modern giants of mass production. For they are few in number. The backbone of our industry is composed of many smaller concerns in which success has come from the exercise of initiative and the personal management of one or a few men rather than from complexity of organization and great financial resources.

One such concern in our field, Kane & Roach, Syracuse, N. Y., has just completed fifty years of successful diversified effort. It has been built from within, not from without, and the story of its progress is worth reading as a typical example of the sort of industrial vertebrae which make a strong National backbone.

ever, are of secondary importance to the three major mechanical developments for which he has been responsible. These are the straightener, the cold roll forming machine and the wrapping type bender. Each of these was the first of its type

to be placed on the American market. Each, also, dates back to the early days of the company.

Today the company is building over 80 sizes and types of straightening rolls, over 70 sizes and types of bending rolls and over 60 sizes and types of forming machines. This line constitutes approximately 80 per cent of the present business of the company.

There are no "do not enter" signs on the doors at the Kane & Roach plant. Visitors can and do see every part of the factory buildings. Engineers and technical men invariably evidence keen interest in the showing of moving pictures which reveal K. & R. machines in actual operation. The company has pioneered the use of motion picture films in its line of business and owns a very extensive film library which is constantly amended and brought up to date. Mr. Kane, although now 71 years of age, is still as active in the company's business as ever. He is on the job all day and every day. It is also interesting to note that for over half a century, Kane & Roach has had neither monetary difficulties nor labor troubles. The company has no outstanding stock or bonds, no outstanding obligations and has never owed money either to banks or creditors.

It is the hope of THE IRON AGE that this typically American metal-working plant will have many happy returns of its fiftieth birthday.

Pennsylvania Makes Electrification Plans

COINCIDENT with the placing of about 28,000 tons of structural steel with several fabricators, the Pennsylvania Railroad last week authorized completion of the electrification of its lines for both passenger and freight service east of Harrisburg, Pa. According to a statement issued by M. W. Clement, president, about 18 months will be required to complete the new work and more than 10,000 men will be employed directly in the project and a like number in the industries furnishing materials.

The roadway construction work for the new electrification will be of the same type as that now employed elsewhere in the railroad's

Eastern electrified territory. It is known as the cross catenary type of construction and is based upon a system of overhead conductors held in place by an arrangement of flexible wires supported between structural steel poles, set in concrete beds beyond the outer edges of the track.

The new electrification is expected to increase materially the capacity of the road as it did in the present electrified territory, without the construction of additional trackage. On completion of the work, a large number of heavy steam locomotives now in use on this trackage can be transferred for service in other parts of the system, increasing the efficiency of handling freight and passenger traffic in territory where steam trains are operated.

The chief parts of lines in the project are the main line from Paoli, just west of Philadelphia, through Lancaster to Harrisburg; the low grade freight line from Morrisville, Pa., near Trenton, N. J., via Columbia, Pa., to Enola yard, near Harrisburg; the freight line from Columbia, following the Susquehanna River to Perryville, Md., and the freight line from Monmouth Junction to South Amboy, N. J., with the necessary yards, connecting branches and equipment.

The new work will involve the electrification of 315 miles of line and 773 miles of track. Upon its completion, the Pennsylvania will have 2677 miles of electrified trackage, or 41 per cent of the total electrically operated standard railroad track in the entire United States.

The Iron Ores of New Jersey

By H. M. ROCHE

Consulting Engineer, Dover, N. J.



MAGNETITE is the important iron ore of New Jersey although bog ore, limonite and red hematite were mined in sizable quantity early in the state's mining history. The deposits of magnetite are found in the Highland area in the northern part of the state. These ores outcrop a broad belt 20 miles wide, extending in a northeasterly direction from Phillipsburg, on the Delaware River, to Greenwood Lake, at the southern boundary of the state of New York, a distance of 60 miles. The area in which the magnetite is found (see map, Fig. 1) contains 1200 square miles and the center of the area is at Dover, 40 miles west of New York City.

¹ H. M. Roche and R. E. Crockett, "Iron-Ore Mining and Milling at Scrub Oak," *Engineering and Mining Journal*, 1933, Vol. 134, pages 161-164, 197-200, 241-244 and 273-277.

² William S. Bayley, "Iron Mines and Mining in New Jersey," *Geological Survey of New Jersey*, 1910, Vol. 7, Trenton, N. J.

³ Henry B. Kümmel, "Geologic Atlas of New Jersey," Passaic folio, 1908; Franklin furnace folio, 1908; Raritan folio, 1914; "The Geological Survey of New Jersey," Trenton, N. J.

In the general area are found 18 parallel ranges or lines of ore deposits. These ranges may be regarded as mineralized zones in which occur orebodies that are rich enough in magnetite to warrant mining. Usually a number of the orebodies lie one above the other in the same plane, all dipping and pitching in the same direction. Within the ranges, there may be several parallel orebodies of workable size. The average strike of the orebodies is N. 41° 30' E., with an average dip of 55° southeast and an average pitch of 15° to the northeast. Orebodies suitable for mining range from 6 to 100 ft. wide, as measured from foot wall to hanging wall. Their heights, as measured on the dip and normal to the long axis of the orebody, vary from 200 to 3,000 ft. The length along the pitch has never been determined by mining, although several of the orebodies have been worked to lengths of 10,000 ft. The grade of the ore as mined today varies from 30 to 60 per cent iron, and the gangue min-

erals are chiefly silica, alumina, magnesia, lime and phosphorus.

A more detailed description of these ore deposits and methods of mining them will be found in articles on iron-ore mining and milling at Scrub Oak.¹ The geology of the New Jersey highlands and the magnetite deposits are discussed in publications of the geological survey of New Jersey.^{2,3}

History

Magnetic iron ore was first mined in New Jersey in 1710 and production, which has been continuous since that time, reached a peak in the year 1882, during which time 932,762 gross tons was shipped. In that year New Jersey ranked second in the United States as a producer of iron ore, being exceeded only by the State of Michigan. Table I shows the total gross tons of iron ore shipped from New Jersey mines from 1710 to 1935, inclusive. The record of shipments is accurate from 1870. Figures since 1870 were taken from reports of the geological survey of New Jersey and checked by private com-

TABLE I
Production of Iron Ore in New Jersey

Period	Number of Years in Period	Shipments, in Gross Tons
1710 to 1870....	161	4,855,832*
1871 to 1910....	40	18,993,559
1911 to 1920....	10	3,887,891
1921 to 1930....	10	2,262,718
1931 to 1935....	5	555,073
1710 to 1935..	226	30,555,073

*Estimated in part.

munication with Meredith E. Johnson, assistant state geologist.

Ore shipped from New Jersey mines from 1710 to 1910 was all hand cobbled or hand picked. Ore shipped from 1910 to 1916 was part hand cobbled and part concentrated on magnetic separators. Ore shipped from 1916 to 1927 was all beneficiated ore, that is, concentrated by means of magnetic separators. Since 1927 all ore shipped was magnetic concentrate, sized especially for sintering.

Hand-cobbled ore ranged in size from "one-man" pieces or chunks down to 1 in. After the introduction of dry magnetic separators in 1910, part of the ore shipped was hand cobbled and part was magnetically separated ore, having a size of 3 in. and under. Hand cobbling was discontinued in 1916 and from that time to 1927, shipments consisted of magnetic concentrate which ranged from 3 in. to 100 mesh in size. Since the advent of sintering at Eastern furnaces, all magnetic concentrate has been 6 mesh and finer.

Hand-cobbled ore, as shipped, probably averaged about 50 per cent in iron, and shipments of part hand-cobbled ore and part coarse dry magnetic concentrate about 54 per cent iron. Shipments consisting of dry magnetic concentrate made at 3-in. size and under averaged 58 per cent iron. At the present time there are six magnetic separation mills at mines in New Jersey. Two of these use dry magnetic separators and produce concentrate at 61 per cent iron. One mill uses a combination of dry separators for coarse sizes and wet separators for the finer sizes and produces concentrate at 63 per cent iron. Three mills use wet magnetic separators and produce concentrate for sintering at 6-mesh size and under at over 66 per cent iron.

There are six fully equipped mines in the state which have been more or less active in recent years. These are the Mt. Hope, Washington, Beach Glen, Richard, Ringwood and Scrub Oak mines. Beach Glen and Scrub Oak produce bessemer ore, the other four non-bessemer ore. The combined production of these mines is 400 tons of crude ore per hr. which, after magnetic separation, yields 284 tons of concentrate per hr., at an average ratio of concentration of 1.4 to 1. At 284 tons per hr. and operating 20 hr. per day for a

NOW that the steel industry is operating practically at capacity and the drain on Superior iron ores again is a matter of considerable moment, this article's timeliness is accentuated. For the author presents an estimate of the non-titaniferous iron-ore reserves of New Jersey and discusses their metallurgical value and future market. Mr. Roche is particularly qualified to deal with this subject; for he has had 20 years of experience in mining and concentrating iron ore in New Jersey and has examined all known deposits in the State with the exception of those at Franklin. In this, the first section of the discussion, attention is directed toward the early history, known reserves and markets for Jersey ores, and a description of the role of Superior and foreign ores is included.

300-day year, a combined output of concentrate for the six mines of 1,704,000 gross tons annually is indicated.

Reserves

The geological survey of New Jersey reports 366 deposits of magnetite in the state that have been mined at one time or another. Some of these were small and were soon abandoned, while others have been worked continuously for nearly two centuries. Of the 366 deposits of magnetite mentioned in the survey report, the writer has failed to locate 49 and considers 166, which are under 6 ft. in width, too small to be of commercial importance. In addition, 61 of the openings reported have been combined with others which were on the same deposit; 90 of the deposits mentioned by the survey are considered as separate and distinct orebodies of a workable size, over 6 ft. in width and 200 ft. or more in height, and the estimate of ore reserves presented in this paper includes only the ore tonnages in these deposits.

Magnetite orebodies in New Jersey are identical in form or shape and their persistence and regularity is remarkable, and, so far as is known, no instance is recorded of

any of these deposits having bottomed. All the orebodies outcrop, and from the outcrop the width, height, dip, pitch and iron content can be determined. These data will hold good, however deep the orebody may be mined. The estimate of ore reserves presented in this paper includes only the workable ore above the 2500-ft. level, which is approximately equivalent to 10,000 ft. on the pitch line of the orebody. Ore density is taken to be 10 cu. ft. per long ton of ore in place.

The estimate of ore reserves is based upon actual detailed examination of outcrops, open pits, underground workings, upon magnetic surveys and diamond drill holes and upon 20 years' operating experience with Jersey deposits. In making the estimate, only ores containing 40 per cent or more iron were considered, deposits less than 6 ft. in width and under 200 ft. in height were not included, and consideration is given to the tonnage in 90 orebodies only.

Table II presents the estimate of New Jersey magnetic iron ore reserves. The first column indicates the range in which the ore deposits are found (see Fig. 1). The second column shows the number of orebodies of bessemer ore, the third column shows the number of gross tons of bessemer ore in each range, the fourth column shows the number of orebodies of non-bessemer ore, the fifth column shows the number of gross tons of non-bessemer ore found in each range, the sixth column shows the total number of orebodies, and the seventh column shows the total gross tons of ore.

The reserve tonnages shown in Table II range from 40 to 60 per cent in iron. All of this ore may be magnetically concentrated at low cost to 67 per cent iron or better. Assume that the reserve tonnage averages 45 per cent in iron and that it will be converted to a 67 per cent iron concentrate at a 1 per cent iron loss in the tailing. The ratio of such concentration would be 1.5 to 1. Table III shows the number of tons of 67 per cent in the reserve tonnage of 45 per cent ore, as shown in Table II.

The estimate of ore reserves presented here differs widely from previous estimates. Table IV shows the most important of these estimates.

The difference in estimates may

be accounted for by difference in grade of ore reserves, by difference in methods of computing tonnages and by difference in time of estimates. The method of computing ore reserves used by Dr. Hayes and by Butler and Birkinbine is not known to the writer. Le Fevre had considerable operating experience with New York and New Jersey ores, and his estimate was based on that experience. Previous estimates were made over 20 years ago and since then considerable knowledge of New Jersey orebodies has been gained through mining operations. In 1914, E. C. Eckel⁸ in discussing the Hayes report wrote:

"A more promising field lies in the older Eastern states. It is probable that careful exploratory work will develop magnetic iron ores in New York, New Jersey and Pennsylvania in quantities far in excess of anything usually considered possible in those states. We have really little reliable information concerning the important magnetite deposits of the highlands of New York and New Jersey, and under these circumstances the Hayes estimate may be accepted tentatively as the best available at the moment."

Since the Hayes report was published in 1908, a considerable amount of exploratory work has been done on New Jersey magnetite deposits, and the reserve estimate presented in this paper is based on the results of that work. In making the reserve estimate, ores that contained less than 40 per cent iron were not considered. But one mine was in continuous operation in New Jersey in 1936

⁸ Estimate for New Jersey, New York, Pennsylvania and other states. The estimate probably allotted 20,000,000 tons to New Jersey.

⁵ C. W. Hayes, "Iron Ores of the United States," United States Geological Survey, 1909, Bulletin 394, pages 70-113.

⁶ Joseph G. Butler, Jr., and John Birkinbine, brief on the iron ore situation in the United States, filed before the United States Senate Finance Committee, 1909.

⁷ S. Le Fevre, "The Magnetic Concentration of Low-grade Iron Ores," Transactions American Institute of Mining and Metallurgical Engineers, 1916, Vol. LVI, pages 892-916.

⁸ Edwin C. Eckel, "Iron Ores, Their Occurrence, Valuation and Control," McGraw-Hill Book Co., Inc., New York, 1914.

⁹ Charles S. Boyer, "Early Forges and Furnaces in New Jersey," University of Pennsylvania Press, Philadelphia, 1931.

¹⁰ J. Leonard Replogle, "Trading on the Tariff," *Saturday Evening Post*, Nov. 3, 1934.

TABLE II

Magnetic Iron Ore Reserves of New Jersey

Range No.	Ore Deposits Sampled	Bessemer Ore, Gross Tons	Ore Deposits Sampled	Non-Bessemer Ore, Gross Tons	Total Ore Deposits	Total Ore, Gross Tons
1	2	3,840,000	..	.....	2	3,840,000
2	4	9,360,000	..	.....	4	9,360,000
3	8	40,940,000	..	.....	8	40,940,000
4	1	12,800,000	7	70,560,000	8	83,360,000
5	7	113,300,000	10	66,700,000	17	180,000,000
6	9	51,360,000	..	.....	9	51,360,000
7	..	.....	4	16,640,000	4	16,640,000
8	3	29,440,000	..	.....	3	29,440,000
9	..	.....	2	7,860,000	2	7,860,000
10	..	.....	3	12,480,000	3	12,480,000
11	2	31,660,000	1	2,560,000	3	34,220,000
12	7	48,000,000	..	.....	7	48,000,000
13	5	15,760,000	..	.....	5	15,760,000
14	4	22,800,000	2	3,440,000	6	26,240,000
15	2	5,000,000	..	.....	2	5,000,000
16	..	.....	3	25,000,000	3	25,000,000
17	3	13,000,000	..	.....	3	13,000,000
18	..	.....	1	1,500,000	1	1,500,000
Totals	57	397,260,000	33	206,740,000	90	604,000,000

and the grade of ore mined averaged only 30 per cent iron. Many millions of tons of reserves could be added to the present estimate if ores of that grade had been included. However, the magnetite

iron were to be mined the life of these reserves would be doubled.

Mining of iron ore and iron making in New Jersey began sometime in the seventeenth century. In 1674 an iron works was in operation at Tinton Falls, Monmouth County.⁹

In the beginning, Catalan forges or "sinking fires" were used to make charcoal blooms, and these blooms were hammered into bar iron. After 1750, charcoal blast furnaces were used to make charcoal pig iron. Later, anthracite blast furnaces replaced Catalan forges and charcoal furnaces, and in recent years only coke blast furnaces were operated. In 1882, New Jersey ranked sixth in the United States in the production of pig iron, being exceeded only by the States of Pennsylvania, Ohio, New York, Illinois and Michigan. Since then, the State gradually lost its rank as a pig iron producer, and by 1920 only three blast furnace plants remained in New Jersey. In 1933, the last of these was sold for scrap.¹⁰

In recent years the principal market for Jersey ores was in eastern Pennsylvania. Since 1920, a large number of merchant pig iron furnaces in that district have been scrapped and this market, in large part, has been permanently lost.

The decrease, from 1920 to 1935, in the number of blast furnaces and in pig iron capacity in New Jersey

TABLE III

Tons of 67 Per Cent Iron Concentrate in Ore Reserves

	Gross Tons of Concentrate
Bessemer concentrate	264,840,000
Non-bessemer concentrate ..	137,826,666
Total	402,666,666

reserves are of sufficient amount to sustain an annual production of 5,000,000 tons of 67 per cent iron concentrate for 80 years, and if ores assaying 30 to 40 per cent

TABLE IV

Previous Estimates of New Jersey Magnetic Iron-Ore Reserves

Gross Tons of Ore	Grade, Per Cent Iron	Year Estimate Was Made	Authority
160,000,000*	52	1908	Hayes ⁵
135,000,000	52	1909	Butler-Birkinbine ⁶
366,000,000	30	1916	Le Fevre ⁷

TABLE V

Blast Furnaces in New Jersey and Eastern Pennsylvania in 1920 and in 1935

State	1920			1935		
	Number of Operating Companies	Number of Stacks	Capacity, Tons of Pig Iron	Number of Operating Companies	Number of Stacks	Capacity, Tons of Pig Iron
New Jersey..	3	4	427,000	None	None	None
Eastern Pa...	26	67	4,911,100	6	15	2,750,080
Total	29	71	5,338,100	6	15	2,750,080

and eastern Pennsylvania is shown by Table V and by Table VI.

Since 1920, the number of pig iron blast furnaces in the United States has been gradually declining. In 1920 there were 461 stacks with a capacity of 42,616,600 tons, and at the end of 1935 there were 257 stacks with a capacity of 52,715,100 tons of pig iron. The number of stacks was considerably reduced, but the capacity of the remaining stacks was increased by 10,000,000 tons over the capacity in 1920. However, as Table VI shows, New Jersey and eastern Pennsylvania lost 2,588,020 tons in pig iron capacity between 1920 and 1935, because 56 blast furnaces were scrapped.

Up to the year 1882 only local ores were used in iron making in the state. Jersey ores also found a ready market in southern New York and eastern Pennsylvania. After 1882, Lake Superior ores came into the Eastern market and production of Jersey ores declined. Since the War foreign ores have replaced Lake Superior ores at Eastern steel plant furnaces partly because of increases in freight rates. Importation of iron ore began in volume before 1882 and has continued in increasing quantities, being especially heavy since 1920.

Imports of iron ore, from 1911 to 1935, are shown in Table VII. This ore entered the United States at New York, Boston, Philadelphia and Baltimore. Recently a small tonnage of foreign ore came up the St. Lawrence River in tramp steamers and thence across Lake Ontario to the Welland Canal and Lake Erie, for delivery to Buffalo and Youngstown.

Foreign iron ore is admitted into the United States duty free, but there is a duty on pig iron of \$1.12½ per ton at the present time. Table VIII shows the various

tariff acts, from 1897 to 1930, on imports of iron ore and pig iron.

Imports of pig iron have increased rapidly since 1920. Between foreign pig iron and surplus domestic cold pig iron from steel

TABLE VI

Decrease in Companies, Blast Furnaces Scrapped, and Loss in Pig Iron Capacity in New Jersey and Pennsylvania, 1930-1935

State	Number of Operating Companies	Number of Stacks	Capacity, Tons of Pig Iron
New Jersey..	3	4	427,000
Eastern Pa..	20	52	2,161,020
Total	23	56	2,588,020

plant blast furnaces, nearly all the merchant pig iron furnaces in New Jersey and eastern Pennsylvania have been driven out of business. Every ton of pig iron imported into the United States means that about two tons of foreign iron ore were used to make the iron, thus displacing the use of an equal amount of domestic

ore. As a result of the imports of iron ore and pig iron and the destruction of most of the Eastern merchant pig iron furnaces, there is at present a very limited market for Jersey ores, a condition which is not likely to improve in the next decade, unless new markets can be found.

Ore requirements in districts within the shipping range of New Jersey ores are shown in Table IX. Lake Superior and foreign ores are the principal ores now used in these districts, but Jersey ores can be used to advantage to supplement part of these ores, as will be shown later.

Table IX shows the number of blast furnaces in Maryland, Massachusetts, New York, eastern Ohio, eastern Pennsylvania, western Pennsylvania and West Virginia in 1935. Pennsylvania is divided, for convenience, into two

TABLE VIII

Duty on Foreign Iron Ore and Foreign Pig Iron

Date of Tariff Act	Iron Ore Duty, Per Ton	Pig Iron Duty, Per Ton
1897	40c.	\$4.00
1909	15c.	\$2.50
1913	admitted free	admitted free
1922	admitted free	75c.
1930	admitted free	\$1.125

districts by a north and south line through the town of Altoona, and the Ohio furnaces listed are east of a north and south line through Cleveland. Furnaces in the Cleveland district are included, however. Only the furnaces in the Wheeling district in West Virginia are

TABLE VII

Iron Ore Imported into The United States, 1911-1935

From	1911-1920 Gross Tons	1921-1930, Gross Tons	1931-1935, Gross Tons	1911-1935, Total Tons
Africa	330,067	2,502,374	13,900	2,846,341
Australia .....	.....	284,970	160,016	444,995
Brazil	10	115,851	None	115,861
Canada	967,897	104,023	20,453	1,092,373
Chile	250,481	10,717,419	788,725	11,756,625
Cuba	8,934,416	4,161,768	221,010	13,317,194
New Foundland	572,191	375,974	None	948,165
Russia	3,916	63,412	113,840	181,168
Spain	994,852	760,760	946	1,756,558
Sweden	1,795,873	2,515,293	57,753	4,368,919
All others	188,028	398,515	115,792	702,335
Total	14,037,731	22,000,368	1,492,435	37,530,534

TABLE IX

Blast Furnaces, Pig Iron Capacity and Estimated Ore Consumption in Maryland, Massachusetts, New York, Eastern Ohio, Pennsylvania and the Wheeling District in West Virginia

State or District	Number of Blast Furnaces, 1935	Annual Capacity in Pig Iron, Gross Tons	Annual Consumption of Iron Ore, Gross Tons
Maryland	6	1,663,200	2,827,440
Massachusetts	1	165,000	280,500
New York	19	3,714,100	6,313,970
Eastern Ohio	39	8,822,600	14,998,420
Eastern Pennsylvania	15	2,750,080	4,675,136
Western Pennsylvania	71	15,029,960	25,550,932
West Virginia	3	802,600	1,364,420
Total	154	32,947,540	56,010,818

listed. Table IX shows also the capacity in pig iron and apparent iron ore consumption per year. The iron ore consumption is based on the assumption that for each ton of pig iron capacity 1.7 tons of ore will be required.

Table IX shows, for the maximum pig iron capacity of furnaces in the districts listed, that 56,000,000 tons of ore will be required. Of this amount about 7,000,000 tons will come from foreign countries and from magnetite mines owned by Eastern furnace companies. About 49,000,000 tons of the ore required for maximum furnace capacity will come from the Lake Superior region. Assuming that blast furnaces operate at 60 per cent capacity, the amount of Lake ore required by furnaces in New York, eastern Ohio, Pennsylvania and West Virginia is about 30,000,000 tons annually. Other furnace districts in the United States that are not listed in Table IX will probably consume an additional 15,000,000 tons of Lake ores, thus making a total

¹¹ E. W. Davis, "First Magnetic Roasting Plant in the Lake Superior Region," American Institute of Mining and Metallurgical Engineers, T.P. 731, 1936.

annual consumption of these ores of 45,000,000 tons.

Superior and Foreign Ores

Much has been written recently of the depletion of Lake Superior iron-ore reserves and various estimates have been made regarding the probable time that the direct shipping ores of that region will be exhausted. An average of the various estimates of reserves of direct shipping ore is 1,500,000,000 tons and the life of this reserve is 30 years, if shipments are at the rate of 50,000,000 tons per year. From 1911 to 1920 the average annual consumption of Lake ores was 51,203,019 tons; from 1921 to 1930, the average consumption was 49,460,617 tons; and in the next decade, 1936 to 1945, the consumption of Lake ores will probably be around 450,000,000 tons. Increasing beneficiation of Lake ores at the mines will tend to reduce the tonnage shipped to furnaces and the shipments from Lake mines for the 10 year period, 1911 to 1920, will probably stand as the high mark for that region.

In addition to the direct shipping ore reserve of the Lake Superior district, there is an enor-

mous quantity of lower grade ore containing from 25 to 45 per cent iron. This low-grade ore reserve is estimated to contain 72,000,000,000 tons. Assume that this reserve averaged 35 per cent iron and that it could be concentrated to 60 per cent iron at a loss of 5 per cent iron in the tailing. The ratio of such concentration would be 1.834 to 1 and the low-grade reserve of 72,000,000,000 tons of 35 per cent iron would contain 40,000,000,000 tons of 60 per cent iron concentrate. The life of the Lake Superior district, by such beneficiation, would be extended about 400 years, if consumption of Lake ores was 100,000,000 tons per annum or double the annual consumption from 1911 to 1930.

There is no doubt that by the time the present reserve of merchantable ore is worked out, a low-cost concentration process for the low-grade reserve will be found and the life of the Lake Superior district extended indefinitely. At the present time there are a number of washing and jigging plants on the Lake Superior ranges and an experimental magnetic roasting and concentration plant at Cooley, Minn.¹¹

Future large scale beneficiation of low-grade Lake ores will probably be magnetic roasting and magnetic separation. The structure of these ores determines, more than any other factor, the method of concentration best suited for them. Gravity concentration can not be used with most of these ores because of the small difference in weight of the silica and the iron oxide. Flotation, because of the low value of the ore, high cost of the fine grinding inherent in the process, and the prohibitive cost of such plants to handle large tonnages, can not be considered. The magnetic experimental plant at Cooley will probably prove to be the forerunner of future beneficiation plants much as the Catalan forges and small charcoal furnaces were of the present-day iron-making processes.

Foreign ores have, in the past few years, received a great deal of attention from advocates of the Great Lakes-St. Lawrence Waterway. Some writers have stated that the high-grade ore of the Lake Superior region will be depleted by 1945, and by that time about 12,000,000 to 15,000,000 tons of

TABLE X

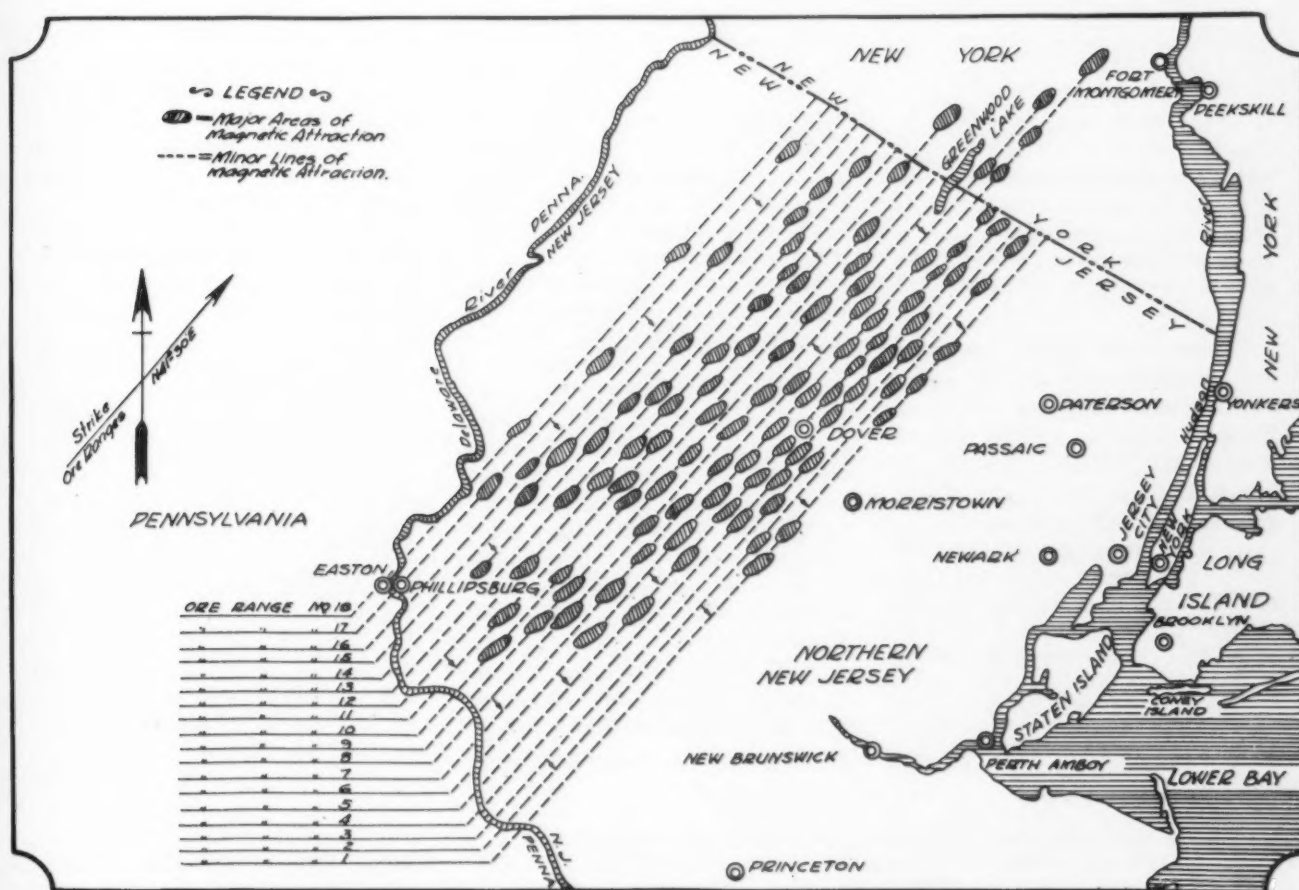
Distances From Brazil, Sweden, Lake Superior and New Jersey Iron-Ore Districts to Pittsburgh

Iron Ore District	By Rail, Mines to Shipping Ports, Miles	By Boat, Shipping Ports to Lake Erie, Miles	By Rail, Lake Erie to Pittsburgh, Miles	Iron Ore District to Pittsburgh, Total in Miles
Brazil Minas Geraes	350	6,688	160	7,198
Sweden Kirunavaara	102	4,550	160	4,812
Lake Superior Mesaba	90	900	160	1,150
New Jersey West End	All-rail haul			416

foreign ore per annum will be required to make up the deficit in the depletion of Lake reserve. Fayette S. Warner¹² is of the opinion that unless foreign ores can reach the Lake Erie iron industries by way of the St. Lawrence Waterway, there will be a tendency for this district to yield its position as the center of iron and steel making to the Atlantic seaboard where foreign ores, which he considers so necessary for the continued operation of American blast furnaces, may be available.

from objectionable elements such as are found in many foreign ores. The excellent practice obtained in smelting Lake ores will be a strong argument for their continued use and will be one of the determining factors when considering beneficiation of those ores. Some of the foreign ores shipped to this country are quite refractory as compared to Lake ores. New Jersey and New York can easily make up any deficiency resulting from depletion of Lake ores, until beneficiation of those ores is solved.

Foreign ores have never been important in the Atlantic seaboard open market ore trade. About 80 per cent of all imports, in the past 15 years at least, have been consigned to one steel company, and about 20 per cent sold in the open market. The average yearly merchant or open market import ore trade, for the past 15 years, has been about 300,000 tons or $\frac{1}{2}$ of one per cent of the total domestic production of iron ore. To increase imports from 300,000 tons to 12,000,000 or 15,000,000 tons



THIS map shows the location and average strike of New Jersey magnetite deposits. The scale is approximately 16 miles to the inch. Note the uniformity of arrangement of the deposits, which is a distinctive feature of the Jersey ore.

Mr. Warner assumes that low-cost beneficiation of low-grade Lake ores will not be possible, that there are no other ores in the United States to be had and that foreign ores will be available in large quantities at prices comparable to the present price of Lake ores.

Lake Superior ores are easily reduced in furnaces and are free

New Jersey and New York mines are today developed and equipped for an annual production of 3,500,000 tons of magnetic concentrate, equal in grade to the best foreign ores. Far less capital would be required to develop sufficient additional tonnage in those states to raise their output to 12,000,000 tons annually than would be required to develop foreign mines and adequate transportation facilities for a like capacity.

annually will require much time and money. Foreign ore producers are not in a position to ship additional large quantities of ore and a large amount of preparatory work with expenditures of vast sums of money will be necessary before such shipments can be made. Prices of foreign ores sold in open market are subject to wide fluctuations and high grade low phosphorus European ores are now selling at $10\frac{1}{2}$ c. to $12\frac{1}{2}$ c. per unit of iron delivered to Atlantic ports

¹² Fayette S. Warner, "The Future Movement of Iron Ore and Coal in Relation to the St. Lawrence Waterway," University of Pennsylvania Press, Philadelphia, Pa., 1930.

TABLE XI

Iron-Ore Freight Charges From Brazil, Sweden, Lake Superior
and New Jersey Districts to Pittsburgh

Iron Ore Districts	Rail Freight, Mines to Shipping Ports, Per Ton	Boat Freight, Shipping Ports to Lake Erie Ports, Per Ton	Rail Freight, Lake Erie Ports to Pittsburgh, Per Ton	Iron Ore District to Pittsburgh Total, Per Ton
Brazil Minas Geraes ..	\$2.015 ^a	\$4.815 ^b	\$1.28 ^c	\$8.11
Sweden Kiirunavaara ...	1.41 ^a	3.275 ^b	1.28 ^c	5.97
Lake Superior Mesaba Range..	.91	.83	1.28 ^c	3.02
New Jersey West End	All-rail haul			2.52

^a This cost is assumed, but is based on American freight rates for the same distance.

^b This cost is given by Mr. Warner, already cited, and is figured on a basis of \$0.00072 per ton-mile, from Rio de Janeiro to Cleveland.

^c Includes a 5c. switching charge at Lake Erie ports.

or about \$7.85, average, per ton. The best European ores, some of which are under governmental control, will not be marketed except at remunerative rates, and it is not to be expected that they will be sold in the future under present prices.

Charles Hart¹² states that there are six great iron-ore reserves in the world. These are the Lake Superior reserve in the United States, the Wabana reserve in Newfoundland, the North Coast reserve in Cuba, the Minas Geraes reserve in Brazil, the Minette reserve of Germany and France and the Lapland reserve in Sweden. Of the foreign reserves, it is probable that only Wabana, Minas

¹² Charles Hart, "Foreign Iron Ores," Transactions of the American Institute of Mining and Metallurgical Engineers, 1929, Vol. 120, pages 7-35.

Geraes and Swedish ores will be available for export to open markets in the United States. Wabana ore, because of chemical and physical properties does not blend well with Lake ores and probably only a limited amount of this ore could be used. Much of the Swedish ore is high phosphorus, and on that account would not be a good mixer with Lake ore, except in small amounts. Brazilian ores are high in iron and free from injurious elements, but transportation cost will limit their use in the Pittsburgh area. There are many other iron-ore deposits in various parts of the world, but much of this ore is not available for export to the United States.

Table X shows the distance from Brazilian and Swedish mines via the St. Lawrence Waterway to Pittsburgh, and the distance from

Lake Superior and New Jersey mines to Pittsburgh. Ores from Brazil, Sweden and Lake Superior take a rail-water-rail haul while New Jersey ore is moved by an all-rail haul. Table XI shows the freight costs to Pittsburgh from ore districts listed in Table X. Table XII shows the average grade of ore, the freight cost per unit of iron, the freight cost per 100 units of iron in the ore and the freight differential in favor of New Jersey ores per 100 units of iron or per ton of pig iron. It is assumed that 100 units of iron in the ore will be required to make 1 ton of pig iron.

The figures given in Table X, Table XI and Table XII are accurate enough for practical purposes. The freight differential of \$7.05 in favor of Lake ore over Brazilian ore and of \$3.91 over Swedish ore, per 100 units of iron or per ton of pig iron, indicates that mining and beneficiation of low-grade Lake ores would be profitable at considerable increase over present mining costs. The freight differential in favor of New Jersey ores is sufficient to create a large demand for these ores in the Pittsburgh district, when high-iron low-silica ores are required to supplement Lake ore.

Because of high delivery cost the best European ores have never been able to compete in the open market on the Atlantic seaboard with New Jersey and New York beneficiated ore. If the present cost of Lake ores was increased by as much as \$3 per ton in mining and beneficiation of low-grade reserves, it is doubtful if foreign ores would replace them in the Lake Erie market. Foreign ores, after completion of the St. Lawrence Waterway, will seek a market in the iron districts adjacent to Lake Erie. The extent to which they can be used will depend upon their delivered cost, which in turn will be governed principally by the freight cost. New Jersey ores have a decided advantage, as shown by Table XII, in low freight rates, and can be delivered to Pittsburgh at a lower freight cost per unit of iron or units of iron per ton of pig iron than either Lake or foreign ores.

Ed. Note—Two weeks hence, in the issue of Feb. 18, the author will complete this discourse on the metallurgical and economic aspects of New Jersey ores by reviewing the metallurgical value, future markets and mining costs of the ores.

TABLE XII

Average Grade of Iron Ore From Brazil, Sweden, Lake Superior and New Jersey,
and Freight Cost Per Unit of Iron in Ore and Per 100 Units of Iron
or Per Ton of Pig Iron From Those Districts in Pittsburgh

Iron Ore Districts	Average Grade of Ore Shipped, Per Cent Iron	Freight Cost to Pittsburgh, Per Unit of Iron in Ore	Freight Cost to Pittsburgh, Per 100 Units of Iron in the Ore	Freight Advantage in Favor of New Jersey Ores, Per Ton of Pig Iron
Brazil Minas Geraes ...	62*	\$0.1309	\$13.09	\$9.33
Sweden Kiirunavaara ...	60*	0.0995	9.95	6.19
Lake Superior Mesaba Range...	50*	0.0604	6.04	2.28
New Jersey West End	67*	0.0376	3.76	...

*Sampling of Brazilian ore deposits showed 67 per cent iron, and it is assumed that crude-ore shipments will average 62 per cent iron. Hand-cobbed crude-ore from the principal ore deposit at Kiirunavaara will only average 60 per cent iron. It is assumed that present-day Lake Superior crude-ore will average 50 per cent iron. Recent shipments of New Jersey beneficiated ores averaged 67 per cent iron.

Radio Towers Raised 100 Ft. With Tubing

RADIO stations WHK and WJAY in Cleveland recently decided to increase the height of their transmission towers from 200 to 300 ft. Calculations by R. L. Allen, Buffalo, the engineer who designed the original towers, which were constructed with structural members, indicated that the strength of the existing towers was not sufficient to carry the increased weight and wind loads that would result from the extensions were these extensions built of structural members. However, he decided that because of the comparatively low wind resistance of round sections and the reduction that could be effected in weight by the use of tubular sections, the required extensions could be built on the existing towers by constructing them of structural tubing, thus avoiding the expense of

the entire reconstruction of the towers.

The tubular steel tower extensions were completed recently. They are built of rail carbon structural steel tubing having a yield point of 65,000 to 70,000 lb. per sq. in. and an ultimate strength of approximately 95,000 lb. The vertical members are made of 2 $\frac{3}{4}$ -in. outside diameter tubing with a wall thickness of 0.217 in. and 0.154 in., the lighter tubing being used near the top. Lacing of 15/16-in. tubing with a wall thickness of 0.105 in. with ends flattened and drilled for bolts ties the members together, and they are also joined by sleeve connections. All members that make up

the structure are bolted together with machine bolts and all bolt holes are reamed. Each tower is surmounted by wheel-shaped top 30 ft. in diameter that is used for the antenna.

The tubing was supplied by Steel & Tubes, Inc., Cleveland, subsidiary of Republic Steel Corp.

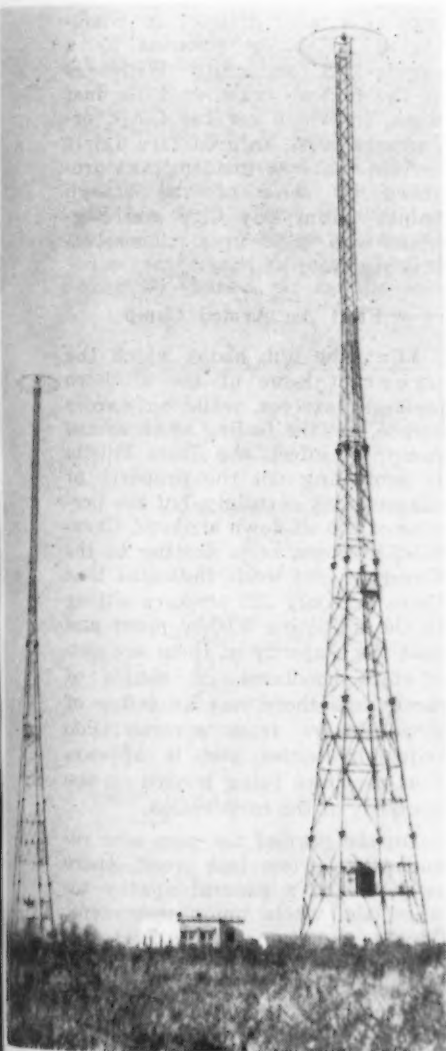
New Extras on Alloy Steels

LEADING producers of alloy steels have announced the following new extras that are to go into effect April 1, 1937:

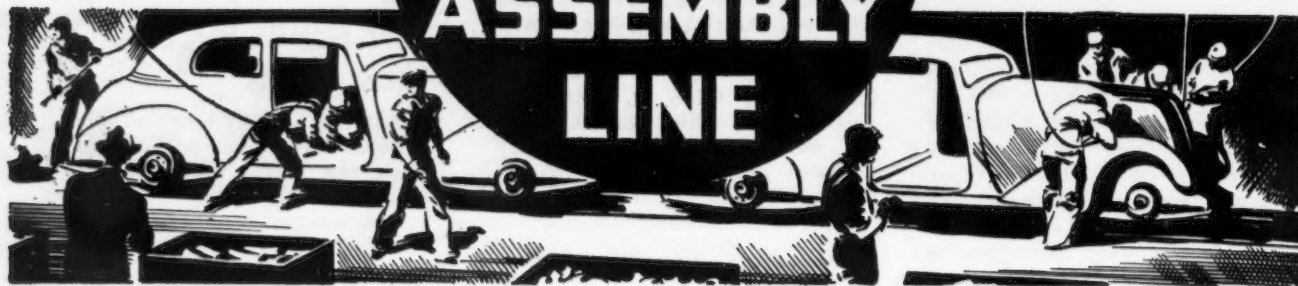
ALLOY STEEL—HOT ROLLED

Ingot, Blooms, Billets, Slabs, Bars, Spring Steel, Bands, Etc.
Extras for Alloy Content

S.A.E. and Special Grades (Chemical ranges expressed in per cent)	Open Hearth Bars		Electric Furnace Bars	
	Extras per 100 Lb.	Billets Extras per G.T.	Extras per 100 Lb.	Billets Extras per G.T.
T-1300 (Mn mean 1.51-2.00) Bars	\$0.10	\$2.00	....	....
T-1300 (Mn mean 1.51-2.00 Car. under 0.20 max.) .....	.35	7.00	....	....
2000 .....	.35	7.00	\$0.55	\$17.00
2100 .....	.75	15.00	1.25	25.00
2300	1.55	31.00	2.05	41.00
2500	2.25	45.00	2.75	55.00
3100 .....	.70	14.00	1.20	24.00
3100 (Ni 1.25-1.75) .....	.80	16.00	1.30	26.00
3200	1.35	27.00	1.85	37.00
3300	3.80	76.00	4.30	86.00
3400	3.20	64.00	3.70	74.00
4100 (Mo 0.15-0.25) .....	.55	11.00	1.05	21.00
4100 (Mo 0.25-0.40) .....	.75	15.00	1.25	25.00
4345	1.65	33.00	2.15	43.00
4340	1.85	37.00	2.35	47.00
4600 (Ni 1.50-2.00, Mo 0.20-0.30)	1.10	22.00	1.45	29.00
4800	2.00	40.00	2.40	48.00
Low-Nickel-Molybdenum (C 0.80-0.90, Cr 0.15 max., Ni 0.55-0.80, Mo 0.10-0.25)	1.00	20.00	1.50	30.00
5100 (Under 0.60 Chrome) .....	.25	5.00	.75	15.00
5100 (Chrome 0.60-0.90) .....	.35	7.00	.85	17.00
5100 (Chrome 0.80-1.10) .....	.45	9.00	.95	19.00
5100 (Spring Flats) .....	.15	....	....	....
52100 .....	....	....	2.60	52.00
6100 (Bars)	1.20	24.00	1.70	34.00
6100 (Spring Flats) .....	.85	....	....	....
9200 (Spring Flats) .....	.15	....	....	....
9200 (Spring Rounds and Squares) .....	.40	....	....	....
9255 (Common Tool Grade)	1.25	25.00	2.00	40.00
Carbon-Molybdenum (Mo. 0.10-0.20) .....	.35	7.00	.75	15.00
Carbon-Molybdenum (Mo 0.15-0.25) .....	.40	8.00	.80	16.00
Carbon-Molybdenum Spring Flats (Mo 0.10-0.25) .....	.15	....	....	....
Carbon-Molybdenum Common Tool Grade (C 0.65-0.75, Mo 0.15-0.25) .....	.90	18.00	1.30	26.00
Carbon-Vanadium (0.15 Va) .....	.85	17.00	1.35	27.00
Nickel-Chrome-Vanadium	1.50	30.00	2.00	40.00
2 $\frac{1}{2}$ % Nickel-Manganese (R.R. Analysis)	1.20	24.00	1.70	34.00
Silichrome (C 0.50 max., Si 3.60-4.20, Cr 1.85-2.50)	2.60	52.00	2.85	57.00
Vanadium 0.18 min. ....	.15	per 100 lb. increase	....	....
Vanadium 0.10 min. ....	.25	per 100 lb. reduction	....	....
Vanadium 0.05 min. ....	.45	per 100 lb. reduction	....	....
Vanadium 0.01 min. ....	.60	per 100 lb. reduction	....	....



THIS WEEK ON THE ASSEMBLY LINE



... General Motors deadlock unbroken as corporation continues to maintain stand of no bargaining until plants are cleared of strikers.

o o o

... Vast majority of employees join in "back-to-work" movement, as vigilantes begin to take matters into their own hands in scattered communities.

o o o

... Ford pushes up schedules, buys 80,000 tons of steel; Chrysler resumes pace with glass supply assured.

o o o

... Graham-Paige to build tractor unit for Sears, Roebuck & Co.

DETROIT, Feb. 1.—Time seems to be the greatest element in the favor of General Motors in its battle against the United Automobile Workers Union and its master strategist, John L. Lewis. As time goes on, it becomes increasingly evident that by far the vast majority of General Motors workers want to work. They are not particularly interested in having Mr. Lewis guide their future destinies. A statement issued by the corporation Saturday indicated that an immediate "back-to-work" movement originating among General Motors employees is supported by 123,724 of the 149,249 workers affected, or nearly 83 per cent.

Several delegations of workers on their own initiative have made trips to Lansing to impress upon Governor Murphy the fact that the rights of the unorganized majority should be protected. They even started a sit-down strike of their own in the Governor's office but were temporarily stalemated by the Governor's departure for Detroit over the week-end.

Incidents of violence occurring at Anderson, Ind., and at Saginaw and Flint, while charged by the union as being perpetrated by hired thugs of the corporation, appeared to disinterested observers to be merely a natural outburst growing out of the increasing re-

sentment of those workers whose livelihood has been threatened through no choice of their own. Particularly is such resentment likely to be found in the smaller towns, where the outside interference of a labor dictator in Washington is keenly resented by a closely knit community. Witnesses of the taxicab crash at Flint last week, in which several C.I.O. organizers were injured, are fairly certain that the incident was provoked by some of the "tough babies" from Bay City and Saginaw who took upon themselves this vigilante activity.

Flint An Armed Camp

Flint, the hub about which the present issue of the sit-down strikers revolves, while outwardly serene, has the feeling of an armed camp. In effect, the State Militia is protecting not the property of the company certainly, but the persons of the sit-down strikers. Chevrolet workers, in protesting to the Governor last week, indicated that there are only 322 strikers sitting in the adjoining Fisher plant and that the majority of them are out-of-state hoodlums. A couple of weeks ago there was an influx of sympathizers from several Ohio industrial cities and it appears that they are being housed on the property of the corporation.

On the part of the men who returned to work last week, there seems to be a general apathy toward the whole union movement. This commentator had a chance to observe Chevrolet workers leaving the plant one afternoon last week. Across the street was the now-famous Fisher No. 2 plant held by



the sit-downers. In the street was a union car with loud speaker unit blaring forth the union's views of the incident the night before, when some organizers had been treated roughly in Saginaw. As far as could be seen, none of the Chevrolet workers seemed to be particularly interested and, before very long, the sidewalk was practically clear of men.

Many charge that the Flint Alliance is the tool of the General Motors Corp. More impartial observers recognize it as an organization sponsored by Flint business men and backed up by the works

councils of the various General Motors plants in Flint. Certainly the speeches made by these plant representatives at the huge mass meeting a week ago were given spontaneously and without prompting on the part of the corporation.

Another incident that has a bearing on the general situation is the comment made by a Cadillac engineer, who stated that he had been unable to get into his office one day last week until after 2 o'clock, when the Dodge men in the picket line went to work on the afternoon shift. It is very evident that the Dodge plant of the Chry-

ler Corp. is very well organized, estimates ranging between 15,000 and 18,000 union men, out of 25,000. Dodge pickets were principally responsible for bringing the strike at the Briggs' Meldrum Avenue plant to a head and they seemed to be the main backbone of such flying squadron units as have appeared from time to time on Detroit streets.

The question uppermost in the minds of those having dealings with the automotive industry naturally is how long the present controversy between General Motors and the U.A.W. may last. Even

AUTOMOBILE FACTORY EMPLOYMENT, PAYROLLS, AND RELATED DATA

(Compiled by Automobile Manufacturers' Association)

Auto, Body, and Parts Manufacturing Industry in United States Only; Census of Manufactures Data, except as noted

	Industry Aggregates								Average Wholesale Value per Vehicle	
	Vehicles Produced		Factory Worker		Individual Factory Worker Averages					
	Number	Wholesale	Average	Annual	Annual ¹	Cost of	Purchasing	Hourly		
	(000)	Value (000,000)	Employment	Payroll (000)	Earnings	Living ²	Power ³	Rate ⁴		
1925	4,178	\$2,952	426,110	\$713,931	\$1,675	103.7	95.7	\$0.703	\$707	1925
1928 ⁵	4,359	3,014	435,000	747,000	1,720	96.3	105.7	0.729	691	1928 ⁵
1929	5,294	3,412	447,448	733,083	1,638	97.0	100.0	....	645	1929
1931	2,295	1,387	285,515	350,526	1,228	79.8	91.1	....	304	1931
1933	1,848	929	243,614	252,106	1,035	67.4	90.9	0.608	503	1933
1935	3,923	2,152	387,725	545,403	1,407	75.1	111.0	0.736	549	1935
1936 ⁵	4,375	2,427	397,000	603,000	1,520	77.9	115.4	0.769	555	1936 ⁵

¹ Annual payroll divided by average employment in which full-time and part-time workers are counted alike. This average is less than the average earnings of full time, year-round workers.

² U. S. Bureau of Labor Statistics Index for Detroit. 1923-25 = 100.

³ Index, 1929 = 100. Annual earnings divided by cost of living.

⁴ From U. S. Bureau of Labor Statistics; special studies in 1925 and 1928; average of regular monthly reports in later years. Not available in 1929 or 1931.

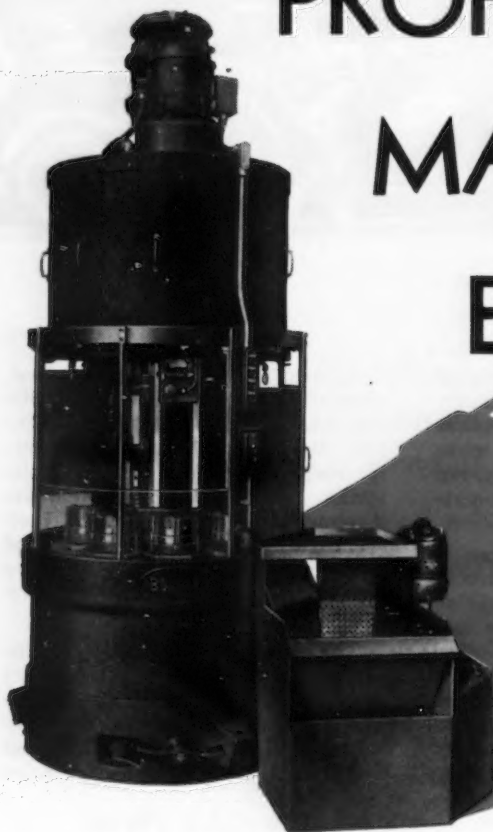
⁵ Estimated from U. S. Bureau of Labor Statistics Employment and Payroll indices and monthly production reports of U. S. Bureau of Census.

BULLARD FORE THOUGHT *IN THE PURCHASE OF*

PROFITABLE

MANUFACTURING EQUIPMENT

TYPE "J7" & "J11" MULT-AU-MATIC



Forethought in the purchase of manufacturing equipment invariably results in Profitable afterthoughts.

We call your attention to this fact because in the design and construction of Type "J-7" and "J-11" Mult-Au-Matics, Bullard Engineers considered forethought as a Prime requisite for your Profitable Investment and afterthoughts.

Let us demonstrate how this works when applied to your Jobs. Send blueprints or samples for estimates and cost facts.

Time Saved is Money Earned.

THE BULLARD COMPANY
. BRIDGEPORT, CONNECTICUT

BULLARD

if the sit-down strikers are gotten out of the plants either by action of the courts (attempted for the second time), their own volition, or by the wrath of the unorganized workers, the negotiations might drag along on the eight points brought up by Homer Martin in his letter of Jan. 4. It seems apparent that the union is holding the plants because they do not believe that General Motors is yet ready to bargain with an open mind on all the points raised. Most observers agree that General Motors will never concede the point of recognizing the U.A.W. as the sole bargaining agency.

A plebiscite staged under the auspices of either the State, Government or the National Labor Relations Board would undoubtedly show that the U.A.W. is not in the majority, and it is that conviction which probably has resulted in the present strategy of the corporation. Even if the Wagner Act is eventually declared unconstitutional, a request coming from the works council groups of General Motors plants could bring such an election about, much to the discomfort of the U.A.W. Already an independent union is being formed in the Chevrolet gear plant in Detroit.

A weakness in General Motors' position has been the fact that after having made some very concrete statements as to what it would and would not bargain about, it later indicated that the corporation would bargain collectively on all of the eight points brought up by the union. The very fact that the 40-hr. week with time and a half for overtime was imposed on all General Motors units two months ago indicated that such things as working hours were a matter of general corporate policy and not subject to individual plant control. In several units of General Motors supplying parts to outsiders the adoption of the 40-hr. week was greeted with no enthusiasm on the part of either the local management or the workers. Besides, the step taken gave the union every reason to believe that one of its demands had been met in part in advance, even before it was formally broached. It may be that the ultimate turn of events will negate all previous agreements to discuss such matters with the U.A.W., simply because their strength will have been discounted by that time.

Madam Secretary Perkins' attempts to get negotiations started again between the union and the corporation have ended in failure, simply because she cannot see why the mere occupancy of two plants should stand in the way of bar-

gaining. To her sit-down strikes are quasi-legal, and this cabinet officer would have General Motors surrender its private property rights in effect by relinquishing its logical stand in this connection. The union would hold these plants as hostages during future bargaining proceedings. A possible solution is the suggestion of using the State Militia to guard the plants against resumption of activities, assuming the sit-downers be withdrawn, during negotiations. At any rate, at this writing, the whole problem is right back in Governor Murphy's lap.

55,500 Men Back At Work

With Buick reopening its plant on Monday with 2000 men and gradually building up to 6000 by the end of this week, there will have been 55,500 men returned to work in General Motors plants. Of this number, about 40,000 will have been returned to Chevrolet plants. This leaves 39,500 provided with no work out of 95,000 employees in non-struck plants. About 31,000 workers are affected in struck plants. Neither Pontiac nor Oldsmobile has yet resumed production, although Pontiac dealers delivered more cars during the first 20 days of January than during all of January, 1936. Pontiac dealers still have approximately a 30-day supply of new cars in stock ready to deliver. Last week unfilled orders on hand at Buick stood at 29,419 at the factory, with

an estimated additional 30,000 unfilled orders on hand in zones and distributing points. Buick reports sales during the first 20 days of January as 89 per cent above the corresponding period last year and more than the entire month of January, 1936.

Ford Issues Steel Inquiries

General Motors competitors have been going great guns. Ford is currently turning out 6000 cars a day at the Rouge plant and 480 daily in Canada. Up until May 1, 857,000 1937 model Fords had been budgeted for production, of which amount 210,000 passenger cars will have the small V-8 engine and 465,000 the large. The remainder will be made up of trucks and miscellaneous items. To go into these cars Ford issued inquiries last week for over 80,000 tons of steel, consisting of square and round bars and slabs for re-rolling in the sheet mill. Incidentally, Ford has accepted Lewis' challenge of being next on the list by strengthening the plant defenses at all entrance points.

Ford's production for the week ended Jan. 30 was 28,325 against 27,165 the previous week, according to *Ward's Automotive Reports*. Resumption of operations on a 5- and 6-day basis in various Chrysler divisions, after a four-day week preceding, together with the Ford increases, boosted the total

(CONTINUED ON PAGE 110)



THE "Back-to-Work" movement originating among General Motors employees may be the eventual deciding element in the present strike crisis. Figures compiled by the corporation last Saturday indicated that 123,724 out of 149,249 workers affected, or nearly 83 per cent, expressed their desire to get back on the job. These are Chevrolet workers "punching in" at Detroit.

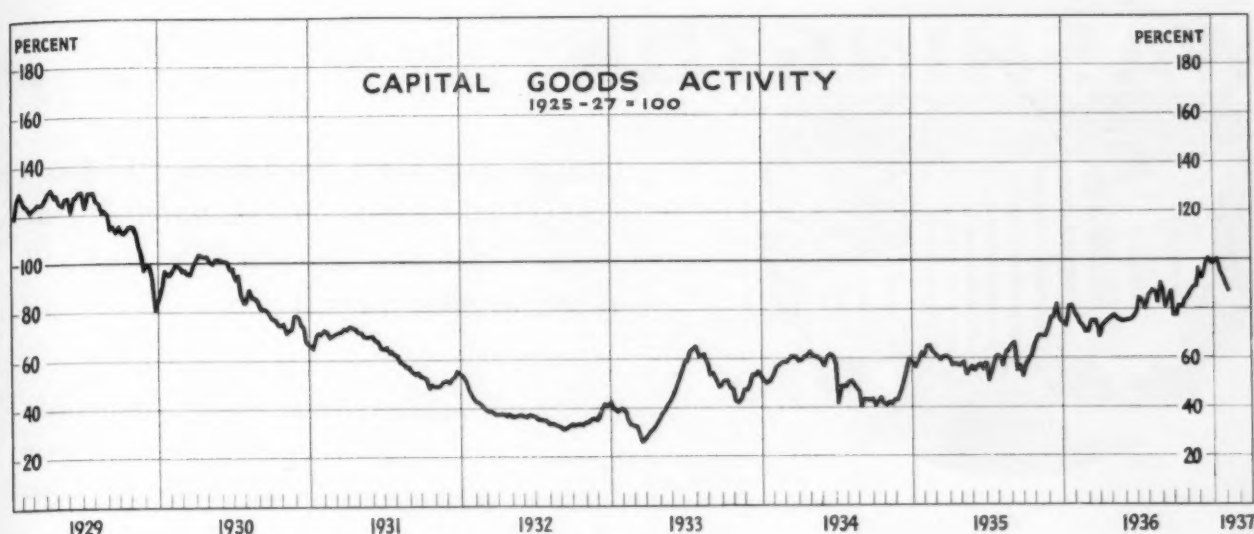
Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	December, 1936	November, 1936	December, 1935	Year, 1935	Year, 1936
Raw Materials:					
Lake ore consumption (gross tons) ^a	4,551,379	4,269,049	3,100,530	30,857,852	44,639,318
Coke production (net tons) ^b	4,608,655	4,288,392	3,488,818	35,141,261	46,317,087
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	3,115,037	2,947,365	2,106,453	21,007,802	30,618,797
Pig iron output—daily (gross tons) ^c	100,485	98,246	67,950	67,556	83,658
Castings:					
Malleable castings—production (net tons) ^d ...	51,674	50,934	45,598	466,395	571,696
Malleable castings—orders (net tons) ^d	67,035	58,152	42,573	452,611	576,334
Steel castings—production (net tons) ^d.....	.....	68,874	37,793	398,988	*722,075
Steel castings—orders (net tons) ^d.....	.....	76,394	40,529	400,157	*749,650
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e	4,431,645	4,337,412	3,073,405	33,417,985	46,919,352
Steel ingot production—daily (gross tons) ^e ...	170,448	173,496	122,936	107,453	150,383
Steel ingot production—per cent of capacity ^e	77.66	79.05	55.53	48.54	68.52
Finished Steel:					
Trackwork shipments (net tons) ^g	5,579	4,756	3,025	42,229	68,813
Steel rail orders (gross tons) ^g	125,290	123,875	88,100	533,120	1,053,230
Sheet steel sales (net tons) ^g	336,758	294,080	203,318	2,473,489	2,720,330
Sheet steel production (net tons) ^g	230,581	224,031	208,774	2,424,990	2,598,140
Fabricated shape orders (net tons) ^g	166,542	121,607	96,235	1,068,603	1,609,016
Fabricated shape shipments (net tons) ^g	121,775	134,115	76,214	1,095,216	1,548,205
Fabricated plate orders (net tons) ^g	51,017	40,519	35,584	258,315	484,038
Reinforcing bar awards (net tons) ^g	18,550	18,740	29,025	318,340	334,790
U. S. Steel Corp. shipments (tons) ^g	1,067,365	882,643	561,515	7,371,299	10,825,132
Ohio River steel shipments (net tons) ^g	111,450	127,425	61,666	926,174	1,169,321
Fabricated Products:					
Automobile production, U. S. and Canada ^k ...	519,132	394,890	418,317	4,119,817	4,616,857
Construction contracts, 37 Eastern States ^l	\$199,695,700	\$208,204,200	\$264,136,500	\$1,844,544,900	\$2,675,296,000
Steel barrel shipments (number) ^d.....	.....	733,215	541,375	6,872,452	*7,653,994
Steel furniture shipments (dollars) ^d	\$2,112,972	\$1,645,626	\$1,558,095	\$15,523,679	\$19,245,935
Steel boiler orders (sq. ft.) ^d	1,872,139	937,437	684,735	6,245,158	11,511,557
Locomotive orders (number) ^m.....	.....	174	2	83	*354
Freight car orders (number) ^m.....	.....	1,550	10,030	18,699	*40,208
Machine tool index ⁿ	257.7	147.1	98.3	†99.9	†180.4
Foundry equipment index ^o.....	.....	200.4	118.1	†119.5	†178.5
Foreign Trade:					
Total iron and steel imports (gross tons) ^p....	.....	61,970	93,678	469,954	*614,254
Imports of pig iron (gross tons) ^p.....	.....	10,615	16,289	130,937	*155,486
Imports of all rolled steel (gross tons) ^p.....	.....	20,655	21,812	216,567	*250,626
Total iron and steel exports (gross tons) ^p....	.....	203,297	239,269	3,067,336	*2,923,502
Exports of all rolled steel (gross tons) ^p.....	.....	123,159	85,590	897,749	*1,046,035
Exports of finished steel (gross tons) ^p.....	.....	100,344	78,625	767,456	*927,800
Exports of scrap (gross tons) ^p.....	.....	59,113	142,135	2,047,290	*1,778,685
British Production:					
British pig iron production (gross tons) ^r	671,400	643,100	559,300	6,425,000	7,681,600
British steel ingot production (gross tons) ^r ...	1,019,200	1,001,300	811,500	9,842,400	11,699,000
Non-Ferrous Metals:					
Lead production (net tons) ^s	47,085	43,831	42,020	421,764	463,187
Lead shipments (net tons) ^s	51,646	50,313	42,333	433,456	512,975
Zinc production (net tons) ^s	47,050	45,742	40,550	431,499	524,271
Zinc shipments (net tons) ^s	59,821	57,107	42,058	465,746	563,273
Deliveries of tin (gross tons) ^v	6,930	5,345	5,360	59,110	74,005

*Eleven months' total. †Three months' average. ‡Revised.

Source of figures: ^aLake Superior Iron Ore Association; ^bBureau of Mines; ^cTHE IRON AGE; ^dBureau of the Census; ^eAmerican Iron and Steel Institute; ^fNational Association of Flat-Rolled Steel Manufacturers; ^gAmerican Institute of Steel Construction; ^hUnited States Steel Corp.; ⁱUnited States Engineer, Pittsburgh; ^jWhen preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; ^kF. W. Dodge Corp.; ^lRailway Age; ^mNational Machine Tool Builders Association; ⁿFoundry Equipment Manufacturers Association; ^oDepartment of Commerce; ^pBritish Iron and Steel Federation; ^qAmerican Bureau of Metal Statistics; ^rAmerican Zinc Institute, Inc.; ^sNew York Commodities Exchange.



THE IRON AGE Weekly Index Numbers of Capital Goods Activity
(1925-27 Average = 100)

Last week	*86.8	Same week 1933	38.4
Preceding week	89.8	Same week 1932	42.8
Same week last month	100.2	Same week 1931	72.1
Same week 1936	77.0	Same week 1930	96.8
Same week 1935	65.0	Same week 1929	124.1
Same week 1934	56.2		

* Preliminary.

BUSINESS received another setback last week at the hands of the flood, effects of which were more pronounced than in the preceding period. Reflecting this situation, the index of capital goods activity, prepared weekly by THE IRON AGE, receded 3 points to a preliminary basis of 86.8 per cent of average, against 89.8 for the previous week and 77.0 for the corresponding week in 1936. Owing to flood interference, weekly data on revenue freight carloadings have been delayed in preparation, and an estimate had to be made of loadings of forest products. For this reason, the latest index number is provisional.

The flood's effects were especially severe on steel mill operations in the Ohio River Valley district,

causing a drop to 75 per cent of capacity in the national ingot production rate from 81 per cent in the week before. It is customary for the rate to increase slightly as between these two weeks. The week's assemblies of automobiles, however, showed a rise, as estimated by Ward's Automotive Reports, output climbing to 76,620 units from 73,509 units, despite the motor strike. Industrial production in the important Pittsburgh district, reflected by the index of the Bureau of Business Research of the University of Pittsburgh, fell off to 103.1 per cent of computed normal from 107.7 in the preceding period. Heavy engineering construction awards rose to \$44,800,000 from \$43,900,000.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

Steel Companies to Recruit College Men

NEARLY 1000 college trained men are expected to find jobs open to them in the steel industry when they graduate this spring, according to estimates made by the American Iron and Steel Institute.

The number of such youths going into the steel industry this year will be larger than ever be-

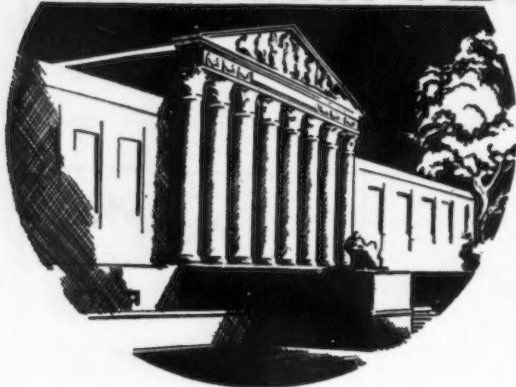
fore, reflecting the expanding operations and increased employment in the industry. Most of them will be from technical and engineering schools.

A number of steel companies have organized plans for recruiting college trained men, close contacts being maintained with various institutions for that purpose. Likely candidates for jobs are selected from among the graduating classes. Some companies also are planning to offer opportunities for

summer training in the mills to under-graduates.

More than 70 per cent of the college men hired by one leading steel company in the past 13 years have held degrees in engineering. About 13 per cent of them were bachelors of arts or of science. Included in the remainder were specialists in economics, marketing, architecture, ceramics, business administration, journalism and law. The men were graduated from some 102 colleges, universities and technical schools.

WASHINGTON.



By L. W. MOFFETT
Resident Washington Editor,
The Iron Age

... *Walsh-Healey Act a "headache" to Government purchasing departments, but Senator Walsh and Secretary Perkins will strongly oppose repeal.*

... *Secretary Perkins finds little favorable response in Congress to her request for subpoena powers in labor disputes, notwithstanding Roosevelt's backing.*

... *First test of the Wagner Act will come in Jones & Laughlin case — Decision expected soon on railroad appeal for freight rate increases.*

WASHINGTON, Feb. 2.—Senator David I. Walsh of Massachusetts, who piloted the Walsh - Healey Government contracts legislation through the Senate, has strongly attacked the report of the Committee on Manufacture of the Chamber of Commerce of the United States urging prompt repeal of the act. The report rather exhaustively analyzes the law and points out its numerous defects and complications and will be considered at the annual meeting of the chamber in Washington April 27-29. The report makes a good case against the act. So have other reports, including those of the National Association of Manufacturers.

Government departments which purchase large supplies of materials are encountering serious difficulties under the act. The Navy Department now has before the Government Contract Board a request for exceptions under the act in order that it may purchase steel for which it has pressing need. Steel interests at a conference in Washington last week pointed out reasons why they have been unable to submit bids under the act.

So far, Secretary of Labor Frances Perkins, whose department administers the law, has stood firmly against modifying regula-

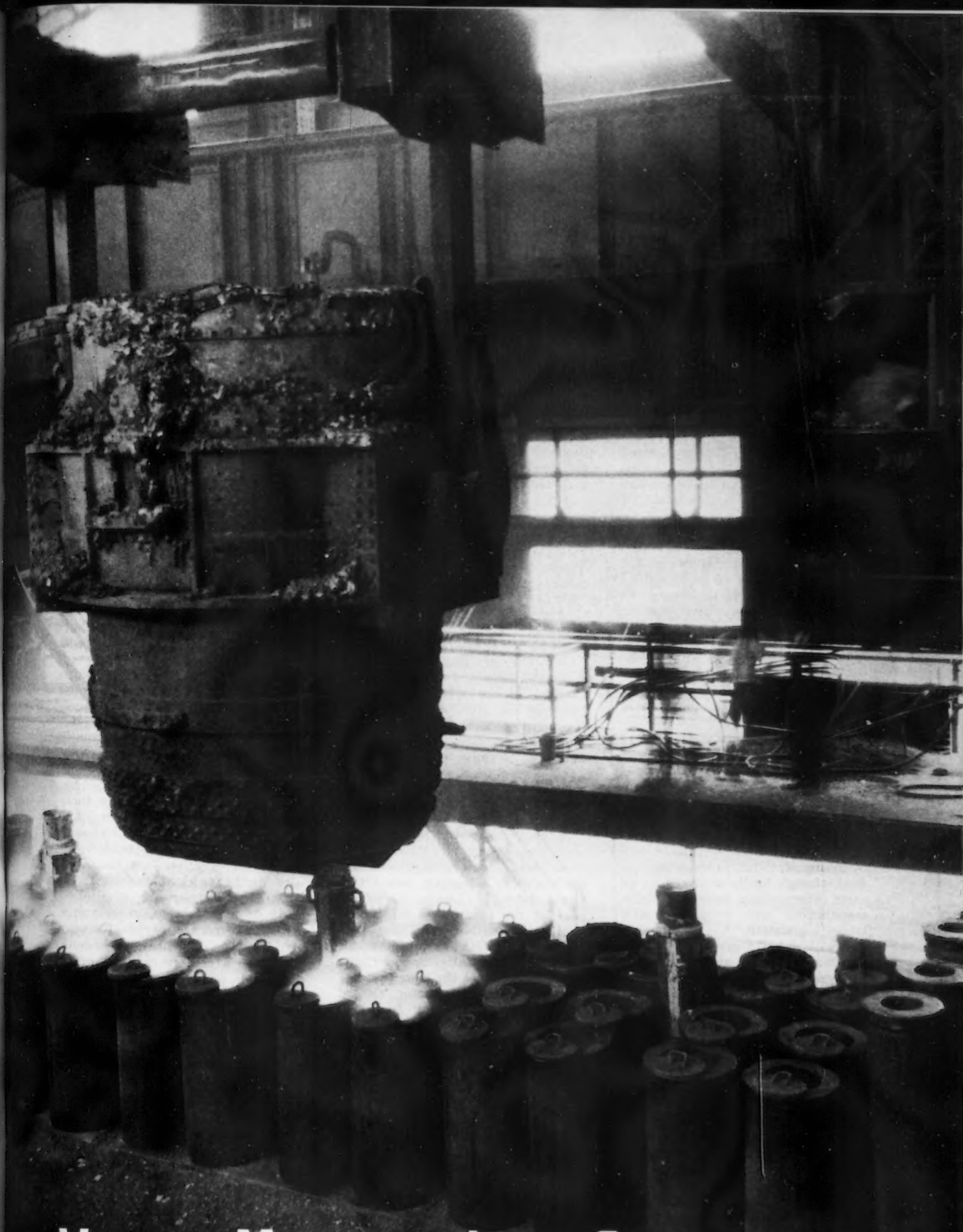
tions which provide for rigid adherence to its terms. Regulations could be modified so that the situation in which Government purchasing departments find themselves would be eased. This is particularly true as they relate to continuous industries, such as steel. It is physically impossible for steel operations to be nailed down hard and fast to a 40-hr. week or to an 8-hr. day or to any other unit of time. The operations may run over or under the 8-hr. day or the 40-hr. week. They average about 42-hr. per week. But if they run overtime the steel maker must pay time-and-one-half for time in excess of 40-hr. Only a portion of the steel may be for the Government. Nevertheless, the additional cost cannot be charged solely to the Government. It cannot be separated from increased costs on steel rolled for private contract. The upshot is that the manufacturer producing Government steel is placed at a disadvantage in the competitive market.

Where Does Production Begin?

There is also the question as to where production begins. Does it start with the ore and other raw products? The blast furnace? The open-hearth furnace? The rolling mill? Or clear down to the prod-

uct from which the finished line is made? For example, if plates are being rolled for the Government, does the act apply back to the raw product, an intermediary product or only at the slab? If it begins to apply at the blast furnace, there is set up the strange situation where a fully integrated plant is handicapped in competing with the plant which purchases its pig iron. Unless its cost of making pig iron is sufficiently lower than the price paid by the competitor who purchases iron to offset the additional cost occasioned by the Walsh-Healey law, it would obviously pay the integrated plant also to purchase iron from a merchant furnace. There are other peculiar alternatives seen. For instance, the greater use of scrap in the open-hearth charge. Of course the maker who starts production at the steel works would manifestly be at a competitive disadvantage, as would the integrated plant, when engaged on Government contracts, with plants which are producing for private contract only. The law forces higher operating costs and also new costs by way of keeping exhaustive records for Department of Labor inspection at any time it may want to look at them.

It may be that the law itself, or at least regulations, will be relaxed. There certainly does not



VALLEY MOULD AND IRON CORPORATION
GENERAL OFFICE **HUBBARD, OHIO**

appear to be any prospect of its repeal. Sponsored by the American Federation of Labor, it has the solid support of organized labor, regardless of the deep rift in its ranks. And that alone is strong indication that the law will not be repealed. The confusion and complication the law has developed, to say nothing of its embarrassment to Government purchasing departments, no doubt is a source of gratification to at least some groups of organized labor. It is a ridiculously vain hope on their part, though one that perhaps some of the act's ardent administration supporters share, that industry will accept the law for uniform application to all its operations as a means of escaping its confusion and complication. To organized labor that would be an effective and quick way of establishing wage and hour standards; because of voluntary action it would not be open to court attack, though it may safely be suggested that it would not stop drives for cutting the hours to less than 40 per week or to increasing minimum wages, or maximum wages, for that matter. The one fact alone, however, that a relatively small portion of industries of the country is affected by the law inasmuch as they do not sell to the Government, shows how idle is the hope that they would accept it voluntarily.

Repeal Would Be Opposed

The law may see some changes in the way of improvement. Senator Walsh indicated it might require modification, but assuredly he would bitterly oppose its repeal just as would organized labor and Secretary Perkins. The latter indeed, though busily engaged in all sorts of activities, including strike negotiations and proposing new labor legislation, has announced she will ask Congress to tighten the Walsh-Healey act. At present its terms do not apply to purchases of \$10,000 and less. Madam Secretary wants the exemption slashed to \$2,000 and she says Senator Walsh will sponsor the amendment, which shows the further barrier faced by the Chamber of Commerce committee, whose vice-chairman is William W. Holloway, president, Wheeling Steel Corp. Among other members of the committee are Eugene C. Clarke, president, Chambersburg Engineering Co., Inc., Chambersburg, Pa.; R. I. Ingalls, president, Ingalls Iron Works Co., Inc., Birmingham, and B. C. Heacock, president, Caterpillar Tractor Co., Peoria, Ill.

Miss Perkins Covering a Lot of Ground

In her breath-taking activities, not to say broad ambitions, to

solve the nation's ponderous labor problems, Miss Perkins has covered a wide range of ground as she hopped, skipped and jumped under the glare of the neon lights of publicity, much of it of her own making. Big as was her undertaking in the General Motors strike situation, this was only a portion of the territory she covered. And in her fearless tread she had to share severe criticism along with whatever enjoyment may have been obtained from getting so prominently in the limelight. Her biting attack on Alfred P. Sloan, Jr., president of General Motors, for his original refusal to accept her invitation to return to Washington to discuss strike negotiations was no more bitter than that directed at her from wide sources for condoning the poachers on General Motors property.

But even more sharp attack was directed at her, and some of it from a source that is ordinarily moderately friendly, for her request of Congress to give her power to subpoena witnesses and records in connection with investigations of strikes. The fiercest blast against this proposal came from high sources in the American Federation of Labor—President William Green and President John P. Frey of the Metals Trade Department of the federation. And the suggestion met with a decidedly frigid reception by leaders in Congress, prominent New Dealers. The Green opposition, significantly, was forthcoming a few hours after it had been indicated that President Roosevelt endorsed Miss Perkins' request. Additional significance was given the Green opposition because it is reported that his erstwhile colleague, now bitter rival, John L. Lewis, ambitious head of the Committee for Industrial Organization, had suggested that Miss Perkins ask for subpoena power. Green flatly opposed the Perkins' proposal. In a long statement he said it is a step toward "compulsory arbitration to which the American Federation of Labor is uncompromisingly opposed."

This, coming on the heels of apparent White House endorsement of Miss Perkins' request, made in letters to Majority Leader Robinson of the Senate and Speaker Bankhead of the House of Representatives, caused the lifting of many eyebrows. Perhaps Mr. Green feels that the White House has been unduly partial to Mr. Lewis and took occasion by way of slamming the proposal to let the White House know how he feels about it. So far Mr. Green has escaped rebuke, such as was mildly and indirectly aimed at Mr. Lewis when, demanding Presidential interven-

tion on his side in the General Motors strike situation, Lewis reminded the White House that he was responsible for by far the largest financial contribution toward the New Deal campaign for reelection. As for Mr. Sloan, the White House rebuke was most direct and personal.

Opposition in Congress

Speaker Bankhead almost froze up, in a polite sort of way, at the Perkins' suggestion. At a press conference he caustically spoke of the proposed legislation as being "rather novel" and in a communication informed Miss Perkins that "as yet" he could not assure her of Congressional action on it. He definitely told her, in reply to her request for haste in enacting the legislation, that it would, if it was considered, have to take the same course as any other legislation and thus call for hearings. Other leaders in "off the record" statements, assailed the proposal in unrestrained terms. But that was before Presidential endorsement was indicated. The approval from the White House may put another complexion on the situation. At that, there is doubt the legislation will be pressed, or passed if pressed. Its proposed arbitrary power which would make it possible to compel citizens to submit to third degree, snooping examination, goes strongly against the grain of even many in Congress who ordinarily enjoy a few healthy jabs at the "economic royalists." Then, of course, there is further reason for their opposition. It is political in character. There is widespread opposition—off the record opposition but vigorous opposition just the same—to Mr. Lewis and his CIO. Strong New Deal supporters, who obviously do not want to go on public record, are very apprehensive over Mr. Lewis's political ambitions. They are afraid he will, if given too much power and can dictate legislation either directly or by proxy, split their party wide open. They think Mr. Lewis's hand is prominently to be seen in the request of subpoena power for the Department of Labor. They also think Miss Perkins is overstretching herself.

That she is reaching out widely was demonstrated further when, simultaneously with her request for subpoena power, she announced she would request legislation greatly to broaden the Wagner Labor Disputes Act. The proposed legislation was put into the hands of what Miss Perkins called the "drafting department" of Congress, and legislation it is indeed. It would not alone establish mini-

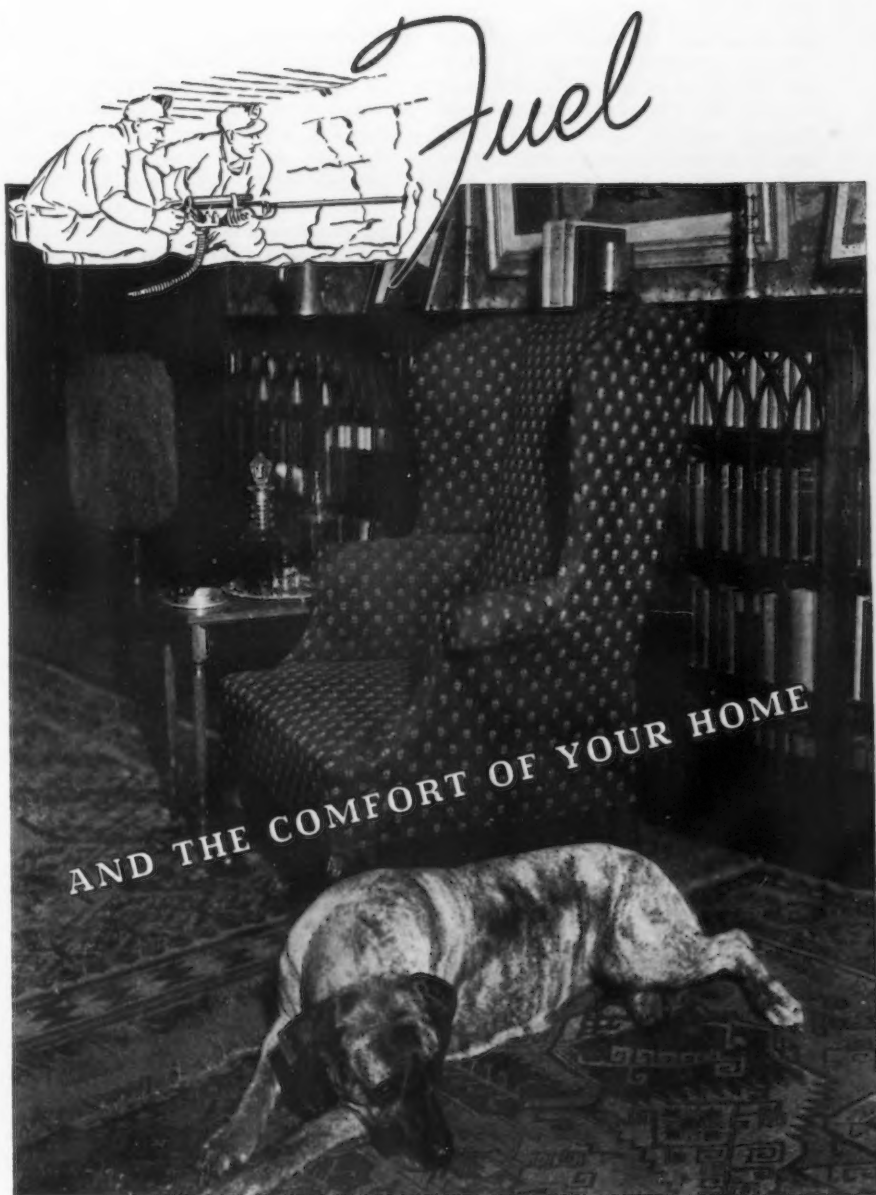
mum wages, and maximum hours, bar child labor and provide for collective bargaining, it would even provide, among its vast reaches, for "improving general physical conditions of working places." This suggestion is not so vague that its far-reaching implications cannot be seen. Fear is felt that the power would reach beyond sweat shops. Miss Perkins explained that her program gives collective bargaining an opportunity to develop without forcing it to develop. The Wagner act, so she said, gives "very limited jurisdiction." And, as if enjoying contact with a hornet's nest, she stated that the National Labor Relations Board had primarily a "judicial function." Could it be, the question was asked, that Miss Perkins again is striving persistently to bring to her department the power to compel collective bargaining, topped by power of subpoena? It will be recalled that Miss Perkins unsuccessfully fought to have the NLRB placed under her department's jurisdiction. It can be imagined how the NLRB has reacted to the suggestion of Miss Perkins to clip its wings. Inasmuch as it would be impolitic to do so, the board has not made public its feelings in the matter but that is hardly necessary.

J. & L. Case First Test of Wagner Act

This board, like other groups and individuals in Washington these days, is quite ambitious. Though pretty much discredited because of its extreme partiality in favor of organized labor, particularly of the CIO brand, the board likes to think of itself as dictator of the country's labor relations. Its leanings may be gained from the fact that it never has officially made a finding on behalf of an employer—that is a finding against complaining unions. These complaints invariably are upheld.

Nevertheless, it is suspected that, despite its pretensions, the board is considerably concerned over test of the constitutionality of the Wagner act, which it has rather futilely sought to administer. The first test will be the Jones & Laughlin Steel Corp. case and the Associated Press case. Briefs in these cases were filed with the Supreme Court last Friday by the Department of Justice preliminary to arguments which begin the week of Feb. 8.

Miss Perkins may share the opinion of Mr. Lewis that the Wagner act will be knocked into a cocked hat by the Supreme Court and is for that reason proposing new legislation to be administered by her department. The administration has not indicated its attitude toward Miss Perkins' proposals to "broaden" the Wagner act. When



JUST OUTSIDE the window, snow may be powdered thick and cold, shrubbery stand garmented in sparkling ice. But in your living room a cheerful warmth persuades you to forget the work-a-day world and let your thoughts drift to your own particular paradise. You're in no mood to think of the fuel that creates this reverie-provoking warmth. And we're very sure you give no thought to high-strength alloy steels and how they contribute to your comfort.

For at the sources of your fuel—in oil fields and coal mines—mechanical tools of high strength alloy steels bite into rock, lick brutal jobs, stand up to cruel punishment.

Many a mine, many an oil well, can trace more efficient drilling and excavating to the day when it first began using equipment made from Lebanon High Strength Alloy Steel Castings. These steels combine lightness, wear resistance and toughness.

Something To Think About: Next time you set a thermostat, think of these Lebanon Steels—for they may help in your business, too. They may have uses unsuspected by you—and in discovering them you may discover the answer to a problem. Our metallurgists and engineers will be glad to explain possible applications.

LEBANON STEEL FOUNDRY • LEBANON, PA.



Stainless and Special Alloy Steel Castings

the President rebuked Mr. Sloan for not accepting Miss Perkins' invitation to come to Washington—later, Mr. Sloan came to see Miss Perkins only to have Miss Perkins unable to have her own way, again criticize him—the President said Miss Perkins was his representative. But it would seem that her proposed labor legislation is not the administration program. Unless it is a trial balloon offered by Miss Perkins for but not as an official representative of the White House. That is only a guess and in view of fast changing uncertain situations in Washington, with its continuous conferences, probes, inquiries, etc., it is well to guess often. But the guess is based on the fact that the White House last

Friday made it known it is not considering immediate transmission of legislative recommendations on wage and hour standards. Perhaps it is awaiting outcome of the decision on the Wagner act's constitutionality. And again perhaps not. Certainly there is no drought of recommendations on labor legislation and industrial regimentation. Donald Richberg is rich in recommendations. So is Major George L. Berry, "coordinator" for industry, who receives a complete absence of help from the major industries of the country. Then Secretary of Commerce Roper's Business Advisory Council has a program which soon will be detailed. Heretofore this council received scant consideration at the

White House. Then again the President has been conferring with groups of labor leaders and a few representatives of industry, among them President Harper Sibley of the Chamber of Commerce of the United States, on wages, hours and abolition of child labor. Secretary Roper has outlined studies which have been accepted by the Business Advisory Council, whose new chairman is W. Averill Harriman, chairman of the board of the Union Pacific Railroad with headquarters in New York. He succeeds George H. Mead of the Mead Corp., Dayton, Ohio. Mr. Green has testified in support of the O'Mahoney Federal licensing bill which set up collective bargaining and wage and hour standards.

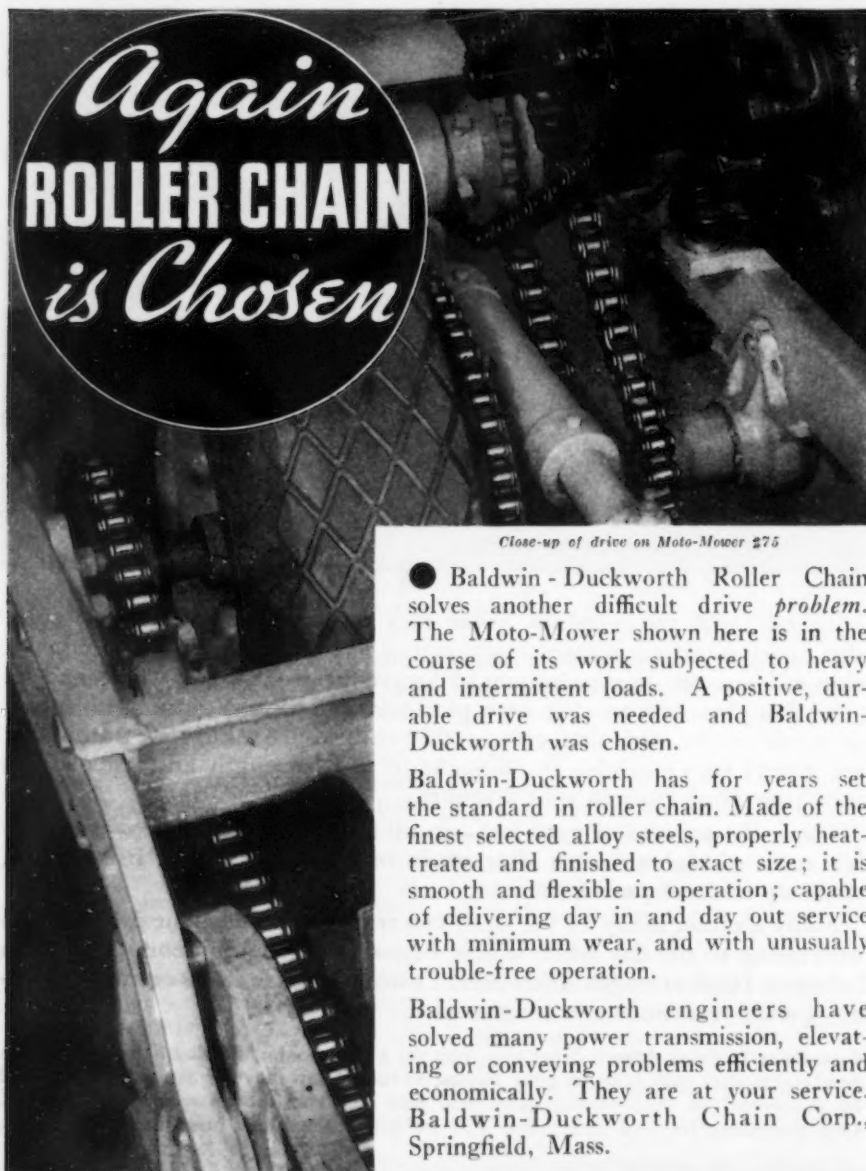
Reciprocal Tariff Program

The council has endorsed the administration's reciprocal tariff program. The program will go through precisely as recommended by Secretary of State Hull, who has asked extension of three years of the President's authority to negotiate reciprocal tariff agreements. The bill was reported out of the House Committee on Ways and Means last week. Efforts of Republicans to amend it to require Congressional approval of the agreements were quickly voted down and Chairman Doughton of the committee said he would attempt to obtain prompt House consideration of the measure.

Freight Rate Increases

Over at the Interstate Commerce Commission railroads are expected in two or three days to complete their evidence to justify increases in connection with readjustment of the general freight rate structure. Evidence as to proposed increased rates on iron and steel and machinery was completed in less than two days last week with but little cross-examination. Shippers will submit evidence when the railroads have completed their case.

A welding conference and exposition, the sixth annual, will be held by the department of industrial engineering, Ohio State University, Columbus, March 3-5. It will include a special course in arc welding design and practice under the direction of E. W. P. Smith, consulting engineer, Lincoln Electric Co., Cleveland. Morning and evening sessions will be held. O. D. Rickly, Ohio State University, is general chairman of the conference.



Again
ROLLER CHAIN
is Chosen

Close-up of drive on Moto-Mower 275

● Baldwin-Duckworth Roller Chain solves another difficult drive problem. The Moto-Mower shown here is in the course of its work subjected to heavy and intermittent loads. A positive, durable drive was needed and Baldwin-Duckworth was chosen.

Baldwin-Duckworth has for years set the standard in roller chain. Made of the finest selected alloy steels, properly heat-treated and finished to exact size; it is smooth and flexible in operation; capable of delivering day in and day out service with minimum wear, and with unusually trouble-free operation.

Baldwin-Duckworth engineers have solved many power transmission, elevating or conveying problems efficiently and economically. They are at your service. Baldwin-Duckworth Chain Corp., Springfield, Mass.

BALDWIN-DUCKWORTH

Arc Welding Foundation to Distribute \$200,000 in Prizes

TO stimulate intensive study of arc welding, the recently established James F. Lincoln Arc Welding Foundation will distribute \$200,000 among winners of 446 separate prizes for papers dealing with this subject as a primary process of manufacture, fabrication or construction in 11 major divisions of industry. The principal prize winner will receive not less than \$13,700. Other prizes range from \$7,500 to \$100—the latter sum to be awarded each of 178 contestants who receive no other prize, but whose papers are judged worthy of honorable mention.

To assure equal competitive opportunity, similar prizes are offered in the 11 major divisions of industry covered by the contest. These divisions are: automotive, aircraft, railroad, watercraft, structural, furniture and fixtures, commercial welding, containers, welderies, functional machinery, and industrial machinery.

Wide diversification of awards is effected by further dividing each major industry into various sub-classifications, with entrants required to select in advance the particular sub-classification to which their papers will relate.

When accepted by the Jury of Awards as properly classified, each paper will be in competition, in its particular sub-classification, for five initial prizes established for that group. These prizes are worth \$700, \$500, \$300, \$200 and \$150, respectively.

From these sub-classification winners, four papers will be selected in each major industry to receive additional prizes of \$3,000, \$2,000, \$1,000 and \$800. Thus these 44 semi-finalists will be awarded a total of \$74,800.

In addition, the semi-final winners in the various divisions will be considered as possible recipients of the four main prizes. These range from \$10,000 to \$3,500, with the winner of the grand prize receiving not less than \$13,700.

Analysis of the complete prize offering shows the following:

1—In the automotive field, 24 prizes with a total value of \$14,200. These to be awarded papers submitted under four sub-classifications; namely: engines, bodies, frames and trailers.

2—In the aircraft field, 14 prizes with a total value of \$10,500. Sub-classifications for the aircraft industry are: engines and fuselage.

3—In the railroad field, 24 prizes with a total value of \$14,200. Four sub-classifications are made; namely: locomotives, freight cars, passenger cars, and locomotive and car parts.

4—In watercraft, 14 prizes with a total value of \$10,500 are established. Sub-classifications are: Commercial and pleasure.

5—In the structural field, 24 prizes, with a total value of \$14,200 are offered. Four sub-classifications are established, as follows: Buildings, bridges, houses, and miscellaneous.

6—In the furniture and fixtures division, the prizes number 14, with a total value of \$10,500. Sub-classifications are: House and office.

7—For the commercial welding division, 14 prizes totaling \$10,500 are set up. Sub-classifications are: Job shops, and garages.

8—In the containers division, 14 prizes with a total value of \$10,500 are established. This division is split into: Contents stationary, and contents moving.

9—In the division of welderies, \$10,500 will be distributed in 14 prizes. This division has two sub-classifications: Commercial and departments of plants.

10—Fifty-four prizes with a total

Solve Gear Problems with **INSUROK** Plastic GEARS

THE use of INSUROK gears (non-metallic) for mechanical equipment offers industry four sharp profit advantages. 1. Savings in power consumption. 2. Longer life . . . fewer replacements. 3. Maintenance of uninterrupted production schedules. 4. Elimination of noise, screech and howl . . . improved working conditions.

The service of Richardson technicians is available without cost or obligation to assist in the application of INSUROK to production facilities and products. Send for literature and INSUROK Handbook.



The RICHARDSON COMPANY

Melrose Park, (Chicago) Ill.
New Brunswick, N. J.

Founded 1858

Lockland, (Cincinnati) Ohio
Indianapolis, Ind.

Detroit Office: 4-252 G. M. Building, Phone Madison 9386
New York Office: 75 West Street, Phone Whitehall 4-4487

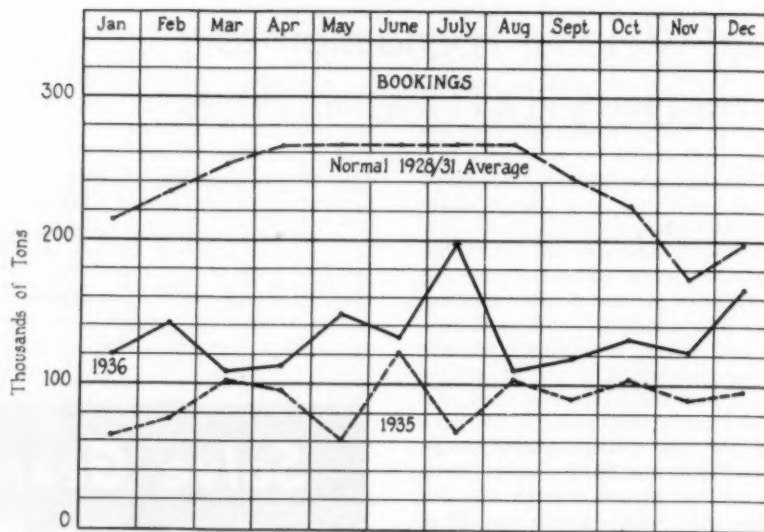
value of \$25,300 are set up in the functional machinery division, which is partitioned into 10 sub-classifications; namely, metal cutting, metal forming, electrical, prime movers, conveying, pumps and compressors, business, jigs and fixtures, parts, and not otherwise classified.

11—In the division of industry machinery, prizes number 54, with a total value of \$25,300. There are 10 sub-classifications; namely, process, construction, petroleum, steel making, farming, household, food-making, textile and clothing, printing, and not otherwise classified.

It is necessary that papers submitted describe either the redesign of an existing machine, structure, building, etc., so that arc welding may be applied to its manufacture; or that they present a design (either in whole or in part) of a machine, structure, building, etc., not previously made—the description to show how a useful result, which was impractical with other methods of construction or could better be done by arc welding, is obtained.

In certain classifications, however, slightly different eligibility requirements obtain. In the divisions of commercial welding and welderies, for example, owners and operators of functioning establishments may enter the competition with papers which describe details for successfully conducting such a business.

Contestants must have papers in duplicate on file with the secretary of the foundation, not later than June 1, 1938. Prospective entrants should communicate promptly with the secretary of the foundation, A. F. Davis, P. O. Box 5728, Cleveland, for details of the rules and conditions covering awards.



Bookings of Fabricated Structural Steel, from American Institute of Steel Construction, Thousands of Tons.

Structural Steel Buying Expands

ORDERS for structural steel placed during December aggregated 166,542 tons, according to the American Institute of Steel Construction, the total having been the largest for any month in 1936 except July, in which bookings were 199,057 tons. The December business compares with 121,607 tons for November and 96,235 tons for December, 1935. Bookings for the 12 months of 1936 amounted to 1,609,016 tons against 1,068,603

tons in 1935, an increase of 540,413 tons or about 50½ per cent.

Opposing the contra-seasonal gain in December volume of orders, structural steel shipments showed the customary decline for the month, aggregate tonnage shipped having dropped to 121,775 tons from 134,115 tons in November and 156,717 tons in October, the high month of the year. The December total was appreciably higher than the 76,214 tons shipped in the corresponding month of 1935, however. For all of 1936, shipments amounted to 1,548,205 tons, compared with 1,095,216 tons in 1935, a gain of 452,989 tons or not quite 41½ per cent.

TOOL STEEL

— for — 50 years

NEW YORK
745 Washington Street
Tel. CHelsea 3-5315
Teletypewriter NY-1-146

BOSTON
915 Oliver Bldg.
Tel. HANcock 4999
Teletypewriter BOS-270

There's a distributor near you.

There is no virtue in age alone, but 50 years' experience in providing the right steel at the right time is a phase of Milne service that thousands of customers have found extraordinarily helpful. Write for our current catalog.

BRANCH OFFICES AND WAREHOUSES

CHICAGO
17 N. May Street
Tel. MONroe 2996

DETROIT
915 Harper Ave.
Tel. MADison 1170-1171

PITTSBURGH
604 Frick Bldg.
Tel. ATLantic 2171

NEW ORLEANS
611 South Peters Street
Tel. RAYmond 0011

A. MILNE & CO.

1887 — FIFTY YEARS OF FRIENDLY SERVICE — 1937

Foundry Show to Have Many Exhibits

INDICATIONS are that the 1937 foundry show at Milwaukee, May 3 to 7, sponsored by the American Foundrymen's Association, will be the largest from the standpoint of number of exhibitors that has been held in many years—greater even than the Detroit show last year. Up to Dec. 29, over 100 per cent more applications for space had been received than in a similar period following announcement of the 1936 Detroit show, many being from companies which did not exhibit last year.

First Contracts Let For Delaware Project

WITH the recent award of contracts to the Dravo Contracting Co., Pittsburgh, for the sinking of 13 of the 30 shafts along the route of the Delaware Aqueduct, actual construction began on the long delayed extension to the water supply system of New York.

Originally proposed in 1927, this \$273,000,000 project, construction of which has been hindered and postponed by various legal technicalities until the present time, will require before its completion many thousands of tons of structural and reinforcing steel, as well as a vast quantity of other materials.

Contracts for the remaining shafts will soon follow, and when all 30 are under construction, their total combined length of 18,000 ft. will constitute one of the largest shaft-sinking operations of all time. The contracts on which work will soon be started are mainly for the sinking and lining of the shafts to tunnel grade, and also include the excavation of about 200 ft. of tunnel in either direction from the bottom of the shafts. The tunnel itself will lie from 300 to 1000 ft. underground with a maximum depth of about 2500 ft., and will extend from the Rondout reservoir near Lackawack in Ulster County, N. Y., to the Hill View reservoir in Yonkers, a distance of about 85 miles.

The entire project is divided into three stages: First, the construction of the reservoirs on the Neversink River and the Rondout Creek, together with the tunnel connecting the Neversink and Rondout and the aqueduct tunnel to the present West Branch reservoir on the Croton watershed, thus making available 170,000,000 gal. daily of additional water. At the same time, the main aqueduct will be constructed from the West Branch reservoir to the Kensico reservoir and thence to the Hill View reservoir.

Second: As the construction above outlined approaches completion, work on the second stage will be begun with the building of the reservoir on the East branch of the Delaware River and the driving of the tunnel through to the Rondout valley, making available 370,000,000 gal. daily of additional water, and bringing the total for the new system up to 540,000,000 gal. daily.

Lastly: As more distant future developments may require, the reservoirs on the Little Delaware River, the Beaver Kill and the Willowemoc Creek will be constructed, together with the necessary connecting tunnels. These sources will make available a further supply of 160,000,000 gal. daily and provide a total supply of 700,000,000 gal. per day.

The Delaware project became

necessary when the total daily demand from New York City and environs increased to the point where it lacked only 69,000,000 gal. per day of using all the available dependable supply. The 700,000,000 gal. additional from the Delaware project will, therefore, not only afford a safe reserve in case of emergencies, but also will adequately provide for normal needs for some time to come.



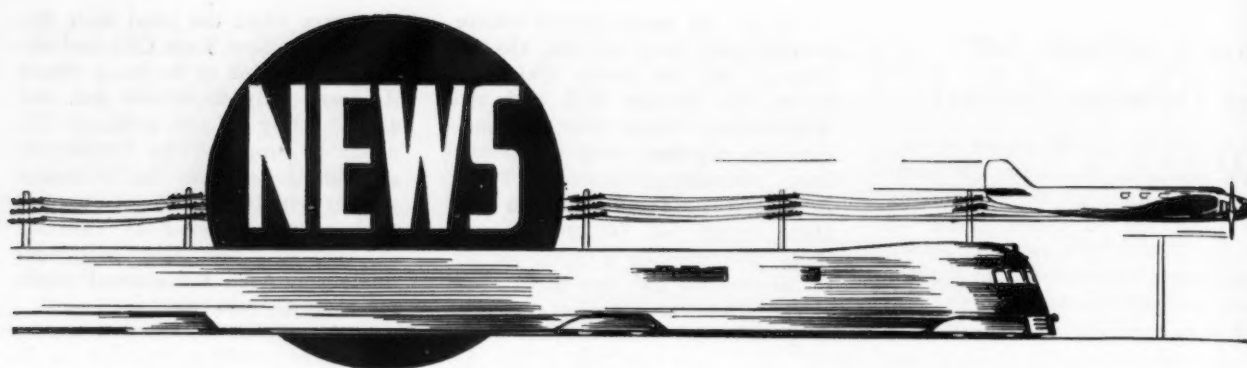
WHERE RESISTANCE TO IMPACT-ABRASION
IS REQUIRED, NOTHING COMPARES WITH **ROL-MAN**

"True" MANGANESE STEEL WELDING ROD

SEND FOR
FREE SAMPLE
AND
CATALOG

Tough-Hard, Strong, Ductile, Wear-Resisting Welds result with ROL-MAN, The Pioneer Manganese Steel Welding Rod . . . Purity of the uniformly dense, fine-grained TRUE (11% to 14%) MANGANESE STEEL, together with the special coating, insures a smooth free-flow and produces a Clean, Even Weld, Without Checks or Cracks . . . The coating definitely shields the arc during welding and excludes harmful inclusions of nitrogen and oxygen. Available in standard lengths and all diameters.

MANGANESE STEEL FORGE CO., BUTLER & ALLEN STS., PHILADELPHIA



Steel Industry's New Equipment Budget for 1937 Tops \$290,000,000

MORE than \$290,000,000 will be spent by the steel industry during 1937 for new construction and equipment, according to estimates received by the American Iron and Steel Institute from 85 companies constituting more than 90 per cent of the total capacity of the industry.

The amount budgeted for 1937 represents an increase of about 45 per cent over the total of \$200,000,000 estimated by the industry a year ago as the sum to be spent for new equipment during 1936. Tabulation of the actual expenditures by the industry during 1936 for capital improvements shows that the estimates made a year ago proved about \$16,000,000 too low.

Nearly every branch of manufacturing operations in the indus-

try will be affected by the large scale improvement program.

At least three new blast furnaces are scheduled to be completed during 1937. Two of these will replace older furnaces, but the

other one represents the first entirely new addition to the pig iron producing facilities of the country since early in 1930. Still other blast furnace plants will be made more efficient with the installation of new auxiliary equipment.

New coke ovens with an aggregate annual capacity of more than 1,000,000 tons of coke are being installed in the industry, exclusive of those coke oven installations which are replacements.

Apollo Steel Co. May Add New Capacity

PITTSBURGH, Feb. 2.—New primary steel-making capacity, soaking pits and a hot strip mill are planned for the near future by Apollo Steel Co., Apollo, Pa., according to A. M. Oppenheimer, president. Final details are not yet completed, but the entire

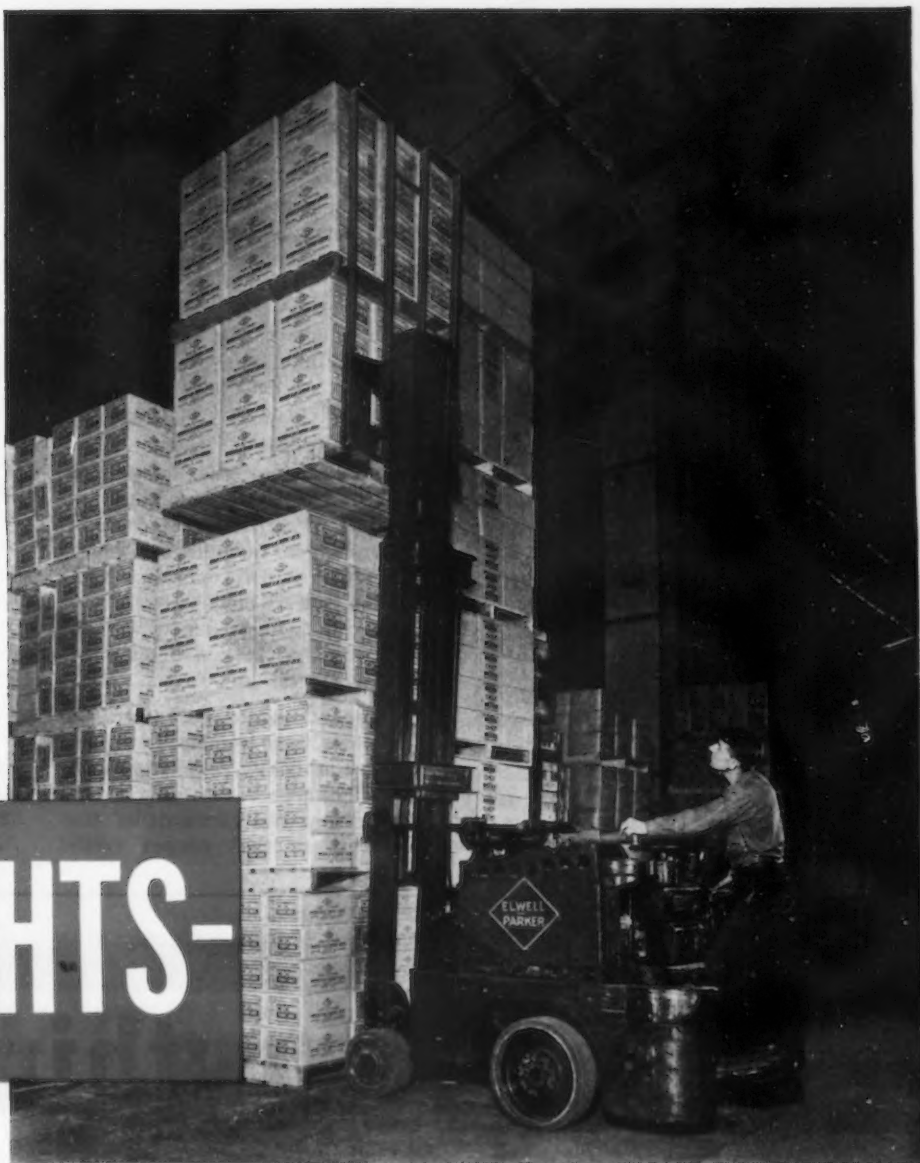
set-up will be submitted to stockholders for their approval within two weeks and, if satisfactory, additional stock will be issued to cover the cost of the project, which is estimated at between \$2,000,000 and \$2,250,000.

The company proposes to erect

NEWS AND MARKET INDEX

Personals	107	Cleveland Market	129
Obituary	111	New York Market	131
January Pig Iron Output	119	Fabricated Steel	142
Steel Ingot Production	120	Non-ferrous Market	133
Summary of the Week	121	Scrap Market and Prices	134-135
Pittsburgh Market	122	Finished Iron & Steel Prices	136-137
Comparison of Prices	123	Warehouse Steel Prices	138-139
Chicago Market	125	Pig Iron & Raw Material Prices	140
Philadelphia Market	127	Machine Tool Activity	143
		Plant Expansion & Equipment	144

AIR RIGHTS-



• Millions of cubic feet of usable space in commercial and industrial warehouses are no longer idle and profitless. This is due largely to the original thinking first displayed years ago by Elwell-Parker Engineers when a customer came asking cooperation on a mechanical method of tiering far higher in his warehouse than the customary 4 to 6 feet.

Neither Elwell-Parker nor anyone else had ever built such a truck successfully, but its Engineers soon designed and built one *that worked*. This customer himself has become a large purchaser; with further engineering development, the Trucks have been applied to the high-piling of material in nearly every industry.

Tiering Trucks are but one of many types of Power

Industrial Trucks which Elwell-Parker Engineers have successfully planned and designed from their knowledge, based upon continuous research to determine current needs and probable future trends of industry.

Today, the counsel of thoroughly qualified authorities on industrial transportation is needed as never before by Management everywhere.

It may be that earlier you were one of those who had not the *confidence* to invest in equipment which would improve your production; while today you have not the *time* to give to it. So, Elwell-Parker Engineers located near you will gladly bring valuable information whenever you call. Elwell-Parker, 4225 St. Clair Ave., Cleveland, Ohio.

New Type ELWELL-PARKER Trucks

ESTABLISHED 1893 • BUILDING POWER INDUSTRIAL TRUCKS SINCE 1906

three 60-ton open-hearth furnaces with an annual capacity of approximately 80,000 tons. At the present time Apollo has no facilities for making raw steel and buys semi-finished material in the open market. Two rows of soaking pits totaling six in all will be constructed. No contracts have been let for construction of any part of the plant nor has the type of hot mill been fully decided upon. There is a possibility that a two-stand mill will be built which will break down 14-in. slab ingots, thus eliminating the need for a blooming mill. Yearly capacity of the hot strip mill will approximate the ingot output of the new furnaces less the crop discards.

The new mill would require about 400 more men than the 1030 now employed by Apollo. Warren Worthington, Pittsburgh engineer, is consultant on the project.

Jones & Laughlin to Add Steel Capacity

PITTSBURGH, Feb. 2.—What will constitute the first new addition to primary steel-making capacity for the Pittsburgh district in a number of years, was indicated recently by H. E. Lewis, chairman of the Jones & Laughlin Steel Corp., when he told a gathering of employee representatives at an annual banquet in Aliquippa, Pa., of the company's plans to build a 7000-ton a month open-hearth furnace. Mr. Lewis also disclosed to the representatives that extensions to the tin plate department at the Aliquippa plant would involve the expenditure of \$3,250,000, while the cost of building the open-hearth furnace and increasing the size of open-hearth ladles would approximate \$750,000. Mr. Lewis also indicated that a new rod mill, to cost approximately \$3,000,000, was in prospect for the Aliquippa works some time this year.

An increase in open-hearth capacity for the Pittsburgh district has been expected for some time, owing to the construction of additional finishing mills. Some plants in the past year or so have been able to rebuild part of their open-hearths so as to increase the rated capacity by as much as 20 to 30 per cent. While no other announcements have been made regarding additional steel-making capacity, it is thought that similar plans are beyond the blue print stage.

Deere Plow Company Celebrates Centennial

ONE hundred years ago in the village of Grand Detour, Ill., John Deere, a local blacksmith, successfully demonstrated the first steel plow. Constructed by hand from a broken steel saw blade, this crude implement was the forerunner of an industry which in 1936 accounted for nearly 500,000 tons of the steel produced in the country.

Centennial celebrations are being held throughout the country in thousands of agricultural communities in which farmers and their families will join in exercises honoring the prairie blacksmith whose contribution helped turn a wilderness hinterland into a domain of prosperous fields and farms.

Previously made of cast iron, the early plows were rendered ineffectual by the heavy, sticky prairie soil, the gummy earth clinging to the shares and moldboards of the implements so that proper culti-

vation of the rich land was impossible. Following Deere's success with the steel plow, the fame of his product spread over the countryside until his blacksmith business became a secondary activity and had to be given up. In 1843, six years after the introduction of the steel plow, Deere entered into a partnership with Major Leonard Andrus, which was dissolved in 1847 when Deere decided to move to Moline, Ill., because of greater business advantages there.

The steel for Deere's earlier plows had come from England, but the uncertainties of shipping overseas and over half a continent necessitated a supply of materials nearer home. Consequently, a pioneer steel company in Pittsburgh was induced to furnish him with the kind of steel needed for his plows. It is recorded that "the first slab of cast plow steel ever rolled in the United States was rolled by William Woods at the steelworks of Jones & Quiggs in 1846, and shipped to John Deere . . ."

Everything *that's round*

If in your operation you make anything round, it's almost certain the new Warner & Swasey Turret Lathes would make it better and for less money. Our trained field engineers are prepared to prove that statement in your own shop. For instance:—

GEARS—(B. Gear Corp.)—a new Warner & Swasey Turret Lathe improved accuracy and cut production time 66%.

PULLEYS—(U. Machine Co.)—A new W & S Turret Lathe combined 10 handlings of the piece into 2, and reduced cost per piece from \$1.20 to 42¢.

MOTOR FRAMES—(H. Mfg. Co.)—By the tool grouping possible on new Warner & Swasey Turret Lathes, parts were cut from 3 to 1, material was reduced 30%, accuracy was improved, and cost per piece reduced 37%.

AND HUNDREDS MORE—Job time reduced 50%, scrap loss cut, operators' work made easier and earnings higher, secondary operations eliminated.

If Savings Like These Interest You Write Warner & Swasey

U. S. Steel Metallurgists Review Welding and Plating Developments

MORE than 50 technologists of the United States Steel Corp. and subsidiary companies gathered in Pittsburgh on Jan. 29 and 30, discussed current practices, research studies and experiments in the manufacture and development of steel and steel products. The meeting was called by R. E. Zimmerman, vice-president of the corporation, and the subjects examined in detail included "austempering," a new method of heat treating, various types of welding, and improvements in the continuous electrolytic deposition of zinc, tin, cadmium, etc.

The new heat treating process, termed "austempering," was described as particularly valuable for making small tools, springs and a wide range of small, hard steel commodities. The salient feature of the new process was described as a combination of correct heating and timed quenching under predetermined schedules, but to in-

termediate temperatures in contrast to the older quenching to ordinary temperatures.

Samples of steel so treated were displayed and bent to destruction before the group, and their novel behavior noted as compared with steel of commensurate hardness tempered through other methods. Steel almost hard enough to cut glass, tempered under old methods, snapped when pressure was exerted, but the "austempered" steel of like hardness could be bent to almost any desired angle.

Photographs showed the new product used in an ordinary long handled, round pointed shovel, bent to an acute angle in a vise. Upon release of pressure on the handle, the shovel returned quickly to its original shape. It was stated that the toughness of the specimens treated by this method probably exceed that imparted to the famous old swords of the romantic eras, such as Toledo blades.

It was anticipated that if the transfer from development to production stage is accomplished in new equipment already under construction, the new product would find a use in a wide range of tools and would be seen in the near future in the shop, the home and on the farm.

The research specialists also discussed at length the many new welding problems of the modern fabricating trend, caused largely by the introduction of high tensile steels in the current demand for reduced weight. "Shot," "spot," and several other types of welding now in vogue were considered largely from the standpoint of arriving at the best methods, with reference to the effect on the specific metal comprising the sheets or plates to be joined. Considerable time was devoted to stock taking with respect to utilization of steel in fabricated housing, and further practical researches were outlined, based on the most promising systems of design taking advantage of steel.

Another of the industrially important developments which came up for discussion at the meeting was a new method for producing extra-heavy, uniform zinc coatings. Even in the finest wires, relatively heavy, enduring zinc coating now can be secured. This process has been brought to a stage of limited production in the plants of the American Steel & Wire Co., Tennessee Coal, Iron & Railroad Co. and Columbia Steel Co.

...except Zeros



WARNER & SWASEY
Turret Lathes
Cleveland

You Can Turn It Faster, for Less with a Warner & Swasey

Machine Tool Show On Pacific Coast

PROBABLY the largest machine tool show and demonstration ever held on the Pacific Coast will open in Los Angeles on Feb. 8 and last through Feb. 14. Backed by the Herberts Machinery Co., Ltd., Los Angeles, in whose showrooms the exhibition will take place, the show is designed partly to afford machine tool users who were unable to attend the Machine Tool Exposition in Cleveland an opportunity of acquiring information at first hand of the industry's latest developments and services.

Many internationally known machine tool builders are scheduled to participate in the attraction, and at least 20 factory demonstrators, in addition to those attached to the staff of the Herberts Machinery Co., which is promoting the show, will be on hand. Several carloads of machine tools will be placed in operation.

Bethlehem Income Best Since 1930; Backlog Heaviest In Many Years

BETHLEHEM STEEL CO. reported last week annual income greater than for any year since 1930 and announced that the company entered the current year with the greatest amount of unfilled orders on hand since the war.

Net profits realized during 1936 amounted to \$13,901,006, equal, after deductions for dividends on the 7 per cent preferred stock of the New Jersey corporation, and both classes of preferred stock of the Delaware corporation, to \$2.09 per share on the common stock. This compares with earnings last year of \$4,291,253, or \$4.59 on the 7 per cent preferred stock then outstanding. Fourth quarter profits, the best of any similar period since 1929, amounted to \$5,291,492, as against \$4,575,058 for the third quarter, 1936, and \$2,396,026 in the final quarter of 1935.

Gross sales and earnings for 1936 aggregated \$287,107,706, compared with \$192,543,458 for 1935. The total amount of new business booked during the year amounted to \$337,729,073, compared with \$210,033,718 for 1935.

The estimated value of orders on hand Dec. 31, 1936, was \$123,690,462, nearly half the total gross

sales and earnings reported for the year, compared with \$93,272,198 at the end of the previous quarter, and \$74,015,251 on Dec. 31, 1935. Unfilled orders on hand at the end of 1929 totaled \$86,000,000; 1928, \$59,000,000; 1927, \$59,000,000; 1926, \$50,000,000, and 1925, \$71,000,000. The Jan. 1 backlog, President Grace stated, has not been reduced during January, thus indicating that incoming business and shipments are about on a par.

Steel production averaged 75 per cent of capacity during the fourth quarter, compared with 69.5 per cent during the previous quarter and 64 per cent for the entire year. Operations in 1935 averaged 39.8 per cent. Current production, Mr. Grace said, is approximately 82 per cent of the capacity, the highest since 1929 and, in his opinion, will probably remain at a high level for some time. All of the sheet mills of the company are operating at 100 per cent of capacity, Mr. Grace added.

Questioned as to whether any orders for war materials had been received, Mr. Grace replied that insofar as he knew none had been taken, and that officials at Washington would first be consulted before any such business would be accepted by the company.

Mr. Grace estimated that a fair amount of the business on hand consists of railroad tonnage, as he commented on the fact that carriers purchased nearly a million tons of rails in 1936. Freight car orders are being received occasionally by the company, whose capacity for this type work is 50 cars daily.

Cash expenditures for additions and improvements to properties in 1936 amounted to \$16,193,549. The estimated cost to complete construction authorized and in progress as of Dec. 31, 1936, was \$38,000,000, a major portion of which is expected to be spent this year.

The directors declared regular dividends of \$1.75 per share on the 7 per cent preferred, and 25c. per share on the 5 per cent preferred, payable in each case on April 1, 1937, to stockholders of record on March 5, 1937.

Republic Steel's Net Up Sharply in 1936

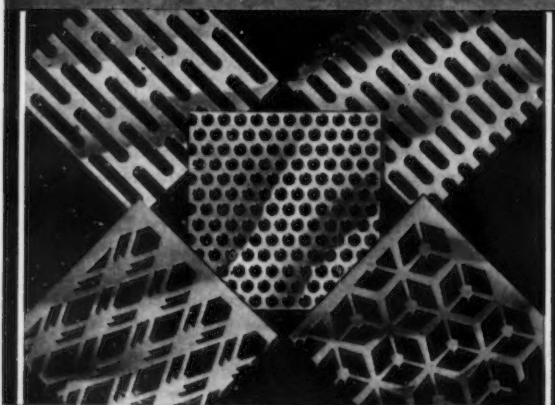
NET income of Republic Steel Corp. and subsidiaries for 1936 amounted to \$9,586,922 after all charges including \$3,000,000 for Federal income tax and surtax on undistributed profits, compared with \$4,455,735 for 1935. Depreciation and depletion charges in 1936 were \$10,130,485 compared with \$8,230,200 in 1935. The net for the year was equal to \$1.74 a share on the 4,127,264 shares of common stock, against 50c. in the preceding year, as based on stock outstanding Dec. 31, 1936.

In a statement accompanying the announcement of earnings, T. M. Girdler, chairman and president, said: "Republic has been carrying out an extensive program of plant improvement. Since 1930 total expenditures for this purpose have been \$65,000,000. The program started in 1936, including the new continuous strip mill under construction in Cleveland, will represent an outlay of \$30,000,000.

"The tin plate mill being built adjacent to the corporation's sheet mill at Niles, Ohio, will be in full operation within the next month. At about the same time the new wire mill in South Chicago will also go into production. This mill is designed to take advantage of the greatly increased demand for steel products from the agricultural sections of the country.

"With the increased efficiency and decreased operating costs due to the corporation's broad policy of plant rehabilitation and modernization, Republic will be in an excellent position to take full advantage of the increased demand for steel products."

PERFORATED METALS



Industrial - Ornamental
ANY METAL ANY PERFORATION

INDUSTRIAL—Whether your screening problems include very coarse or extremely fine materials, you will obtain the best results with perforated metal. H & K screens have increasingly served in all fields of industry for many years and established an unequaled standard in lasting performance. Regardless of size, metal or perforation, permit us to discuss your requirements with you.

ORNAMENTAL—Beauty of ornamental grilles depend largely on the experience of the designer and producer. Experience has built a complete assortment of H & K ornamental grilles that will satisfy your wants in both design and price.

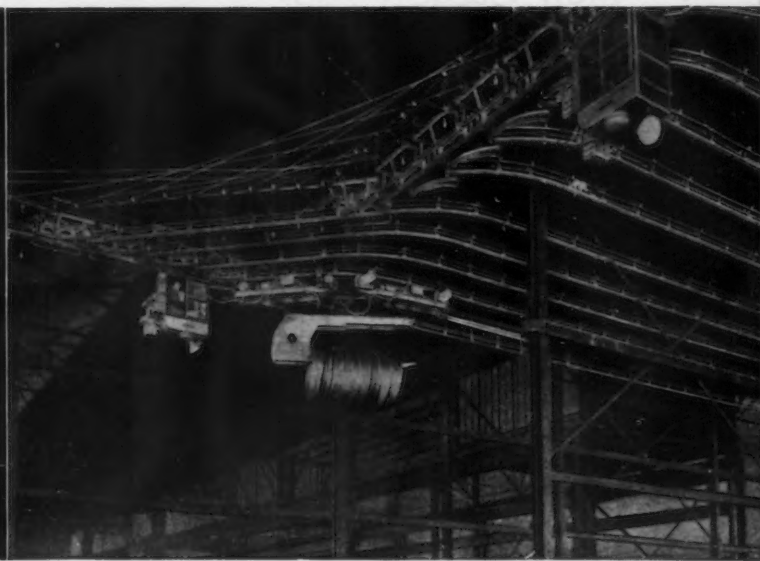
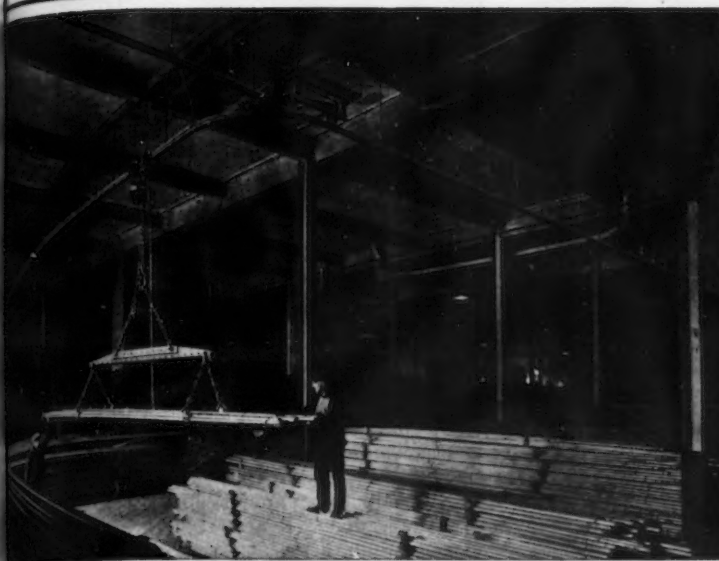
Write us for further information.

The Harrington & King
PERFORATING CO.

5657 FILLMORE ST., CHICAGO

114 LIBERTY ST., NEW YORK

CLEVELAND TRAMRAIL MATERIALS HANDLING EQUIPMENT

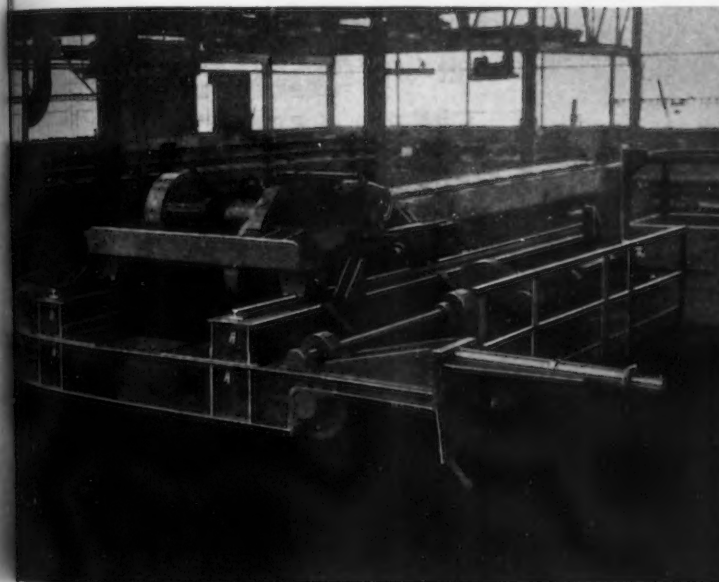


Consult your 'phone directory under Cleveland Tramrail

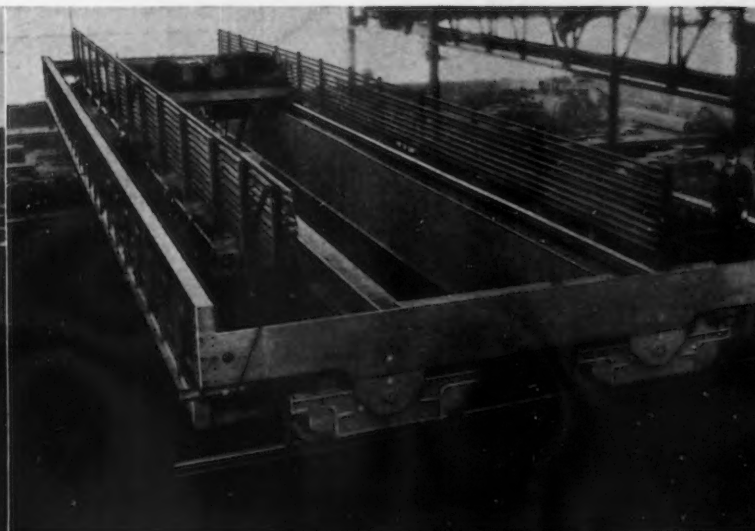
● For an installation of one length of rail and a hand propelled carrier to systems consisting of miles of rail, dozens of switches, cranes and high speed motor operated units, there is Cleveland Tramrail to fit all industry.

● By reason of their years of progress in materials handling practice the Cleveland Tramrail organization can be of much assistance in your planning.

CLEVELAND ALL WELDED CRANES FOR EVERY INDUSTRY



10 Ton 3 motor 26' Span



10 Ton 3 motor 120' Span

All welded cranes were pioneered and developed to their present high efficiency by Cleveland. They are now in service in all industry where heavy duty cranes are required.

The Cleveland Crane Engineers can give you, as a purchaser, the benefit of this background of successful progress.



THE CLEVELAND CRANE & ENGINEERING CO.

WICKLIFFE OHIO

New Capacity Aids National Steel

NATIONAL STEEL CORP. reports preliminary net earnings for the December quarter of \$4,628,729, equal to \$2.14 a share on 2,162,277 outstanding shares of capital stock, after all charges including interest, taxes, depreciation and depletion, but before provision for Federal undistributed

profits tax. This compares with net earnings for the final 1935 quarter of \$2,532,693.09, equal to \$1.17 a share on 2,156,977 outstanding shares.

Preliminary earnings for the year 1936, before Federal surtax provision were \$13,171,149, equal to \$6.09 a share, which compares with \$11,136,452, or \$5.16 a share, in 1935. The earnings for the fourth quarter and the entire year of 1936 were the highest quarterly and annual earnings in the history

of the corporation. After deduction of the undistributed profits tax in amount of \$629,307, net earnings for the year were \$12,541,842, equal to \$5.80 a share.

Quarterly earnings through 1936 were marked by a strong upward progression. The net of \$1.10 a share for the first three months was followed by \$1.30 a share in the second quarter, \$1.56 a share in the third quarter and \$2.14 a share for the final quarter.

The fourth quarter earnings reflect to a certain extent the advantages made possible by the increased production of the new 96-in. continuous hot and cold strip sheet mill at National Steel's Detroit subsidiary, Great Lakes Steel Corp., and also by the increased steel production capacity provided by four open hearth furnaces placed in operation at Great Lakes during the final quarter.

The 1936 earnings were after absorption of non-recurring items of expense incident to starting and developing the new 96-in. mill, and losses at the Steubenville plant of the Weirton Steel Co. resulting from the Ohio River flood in March, 1936.

Combining Stamping and Welding

lowers die cost and makes it possible to gain benefit of rolled steel strength for small quantity purchases.

The channel of this inclinator frame is pressed steel 3" deep and 1/8" thick. The lugs and bosses are welded in place.

Parish engineers consider all phases of the problem; appearance, strength, improved design, and production methods leading to minimum costs.

PARISH PRESSED STEEL CO.
Reading, Pa.

PACIFIC COAST REPRESENTATIVE
F. Somers Peterson Co., 57 California St.
San Francisco, Cal.



Woodward Iron Co. Completes New Set-Up

THE plan of reorganization for the Woodward Iron Co., submitted to the Federal Court in Birmingham on Dec. 23, was approved on Jan. 29 with certain minor changes and will now be placed in operation.

Holders of the 6 per cent gold notes will receive \$1,305.57 for each \$1,000 and the option of accepting cash or new bonds for this amount, which represents par plus interest and interest on interest from Aug. 1, 1932, to Feb. 16, 1937. The bond option must be exercised by Feb. 10, otherwise cash will be paid.

Holders of old bonds, which have a par value of \$1,000, will receive in satisfaction of principal and interest \$500 of new fixed interest bonds and \$725 in new income bonds.

Holders of old 6 per cent preferred stock will receive 3 1/2 shares of new common stock for each share. Holders of old 7 per cent preferred stock will receive 3 1/2 shares of new common stock plus \$2.81 in cash for each share. Holders of old common stock will receive one share of new common stock for each share.



FINANCIAL NOTES

Jones & Laughlin Steel Corp., at a directors' meeting on Jan. 26, decided not to declare the regular dividend on its cumulative 7 per cent stock, normally payable April 1, but declared a dividend of 1½ per cent, or \$1.75, a share on its preferred stock, payable April 10 to holders of record March 26. This step was taken in order to reduce dividend arrearages on the preferred.

Inland Steel Co. has declared a dividend of \$1 a share, payable March 1. Last year quarterly dividends were paid at the rate of 75c. a share, plus an extra \$1.50 paid Dec. 17. The preliminary earnings report of the company shows net profit of \$12,887,647, equal to \$8.59 a share on the capital stock outstanding. In 1935 earnings a share were \$6.54.

United Engineering & Foundry Co. has declared a dividend of 50c. on the common and the regular quarterly dividend of \$1.75 on preferred, both payable Feb. 16 to holders of record Feb. 6.

Interlake Iron Corp. contemplates selling a maximum of \$10,000,000 of convertible debentures. The proceeds will be used for the redemption on May 1 of \$4,600,400 of By-Products Coke Corp. 5½ per cent first mortgage bonds and \$4,129,500 of Interlake Iron 5 per cent first mortgage bonds. Also, part of the proceeds will be used to reimburse the company for funds used in January, 1936, to redeem \$2,176,200 of Zenith Furnace Corp. first mortgage 2½ per cent bonds.

Keystone Steel & Wire Co. reports net profit of \$387,805 for the six months ended Dec. 31. This compares with \$717,136 for the corresponding period of 1935.

A. M. Castle & Co. reports 1936 net profit at \$559,377, or \$4.66 a share, compared with \$348,407, or \$2.90 a share, for 1935.

Otis Steel Co., Cleveland, earned in 1936 approximately \$2,800,000 after all charges except Federal income tax and surtax on undistributed income estimated at approximately \$805,000, according to preliminary estimates.

Otis Steel Co., Cleveland, has made public offering of a new issue of \$15,000,000 first mortgage sinking fund 4½ per cent bonds, Series A, dated Jan. 15, 1937, and maturing on Jan. 15, 1962. Proceeds of the sale are to be used as follows: \$10,989,912 for redemption of \$10,827,500 of first-mortgage 15-year 6 per cent sinking fund bonds, Series A, due March 1, 1941; \$2,914,000 for additions and improvements at company's Riverside plant at Cleveland; and the remainder to increase working capital for general corporate purposes.

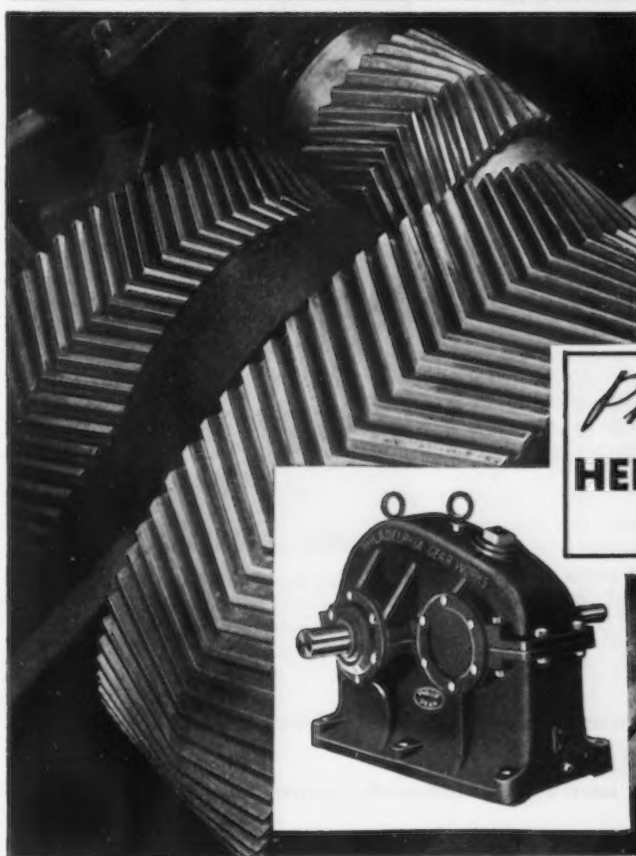
Inland Steel Co. and subsidiaries has consolidated net income in 1936 of \$12,888,647 after all charges including Federal income and excess profits tax, equivalent to \$8.59 a share on the capital stock out-

standing. This compares with net income of \$9,417,818, or \$6.54 a share, in 1935. Net income for the quarter ended Dec. 31 was \$3,867,625, including profits of the Milcor Steel Co. Profits for the year, however, do not include profits of this company for the first six months of 1936. The company declared a dividend of \$1 a share on the capital stock, payable March 1 to holders of record Feb. 15.

Continental Steel Corp. and subsidiaries had estimated net income in the fourth quarter in excess of \$275,000 after allowance for quarterly preferred stock divi-

dends, equal to over \$1.14 a share on the common stock outstanding. This compares with \$71,842, approximately 14c. a share, for the third quarter. Statement of earnings was given out by D. A. Williams, president, who declared that his company's plants had operated at full capacity throughout the final quarter of 1936.

Rustless Iron & Steel Corp., Baltimore, reports net profit after charges and estimated Federal income tax of \$350,707 for 1936, compared with \$166,133 for 1935. Net profit in the final quarter of 1936 before Federal income tax was \$152,434.



for
**TOUGH
HEAVY
SHOCK
LOADS**
... at
HIGH SPEEDS

Philadelphia
**HERRINGBONE
REDUCER**

the
**IDEAL UNIT
for
STEEL MILL
SERVICE**

- Great strength, rigidity, compactness, absolute dependability and the ability to "take it" day in and day out . . . all are inbred qualities of these widely used Speed Reducers.

Numerous Steel Mill power transmission requirements involve heavy shock loads at high speeds—frequent overloads—continuous back-breaking service—frequent stops and starts—many reversals, etc.—tough, trying service for any Speed Reducer, yet Philadelphia Herringbone Reducers have been used throughout the industry for years, always delivering the maximum input horsepower at the required R.P.M. . . . silently, smoothly, faithfully and with practically no attention. Send for Catalog.

PHILADELPHIA *Speed Reducers*
Philadelphia Gear Works
Industrial Gears and Speed Reducers
Erie Avenue and "G" St.
PHILADELPHIA



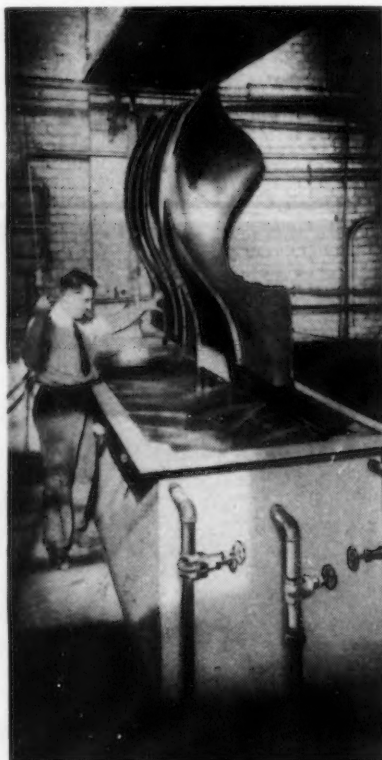
Increasing the Utility of Chemical Rust-Proofing Processes

UNTIL recently, practically all of the chemical rust-proofing processes in commercial use were formulated to react on iron and steel only. However, one of the largest concerns in the business of producing rust-proofing chemicals has been doing research work in the development of formulae that will react on other metals and recently announced a new process that produces a corrosion inhibiting coating on galvanized, zinc alloy and cadmium surfaces, as well as on iron and steel.

In addition to being corrosion resistant, the coating is highly adherent, being integral with the metal itself, and having slight porosity, it is said to form an ideal base for any type of paint finish.

This process is called Dip-Spra Bonderizing by its sponsors, the Parker Rust-Proof Co. It is a new method of application, whereby the effectiveness of a prior process, Spra-Bonderizing, is adapted to the needs of the producer, whose requirements do not justify the installation of conveyor equipment. In other words, it is said to combine the coating efficiency of Spra-Bonderizing with the lower equipment costs and convenience of an immersion process, as well as widening the utility of

Bonderizing to include certain non-ferrous metals.



Illustrating the simplicity of the Dip-Spra Bonderite tank and showing how spray pipes are installed.

This new process will be of interest to many manufacturers whose products must be painted, especially those who have had some difficulty in getting effective adherence of paint to galvanized or other zinc coated surfaces. It is claimed that the coating produced by this process will increase the paint holding efficiency from five to seven times, which has been amply demonstrated by many accelerated tests in the Parker laboratories.

The equipment requirements are said to be comparatively simple and easy to install, consisting only of a steam heated processing tank of suitable size, in which a spray pipe is placed above the solution level. This spray pipe is plain stainless steel, drilled with a series of 1/8-in. holes from 2 in. to 4 in. apart, through which the solution is circulated by a small pump, placed at one end of the tank. Large or deep tanks are fitted with a spray pipe on each side.

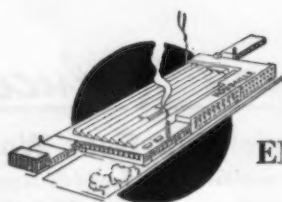
Bausch & Lomb Expand Research Facilities

AT a cost of approximately \$40,000, and with a 50 per cent increase in its staff of graduate chemical engineers and metallurgists, the Bausch & Lomb Optical Co., Rochester, N. Y., has opened a new laboratory for applied research. Nearly 9000 sq. ft. of space on the fifth floors of two buildings has been converted into a series of laboratory units devoted to research in the fields of metallurgy, experimental electro-plating, spectroscopy, photomicrography, and physical testing.

One of the most interesting units is that in which Dr. James E. Wilson and his assistant, Vernon Patterson, are engaged in applying metallurgical equipment to the study of the structure of the steels and alloys used in industry. This unit will act as a control for materials used in the plant and will assist the sales department in supplying information sought by customers. Closely allied with this department is the laboratory for spectrographic analysis. In addition to testing spectrographic equipment built for laboratories in the United States, the application of spectroscopy to industrial problems, particularly in the field of metallurgy and ceramics, has been recognized as indispensable. With the facilities of the new laboratory, the company will assist industry in the solution of problems in which spectroscopy is important.

The testing and control labora-

YOU probably aren't an automobile manufacturer. You probably aren't interested in piston pins. But it may interest you to know that Houde produces them for one of America's largest automobile companies — that Houde also produces an infinite diversity of metal parts and assemblies for scores of other manufacturers strictly on a basis of speed, precision and lower costs. Perhaps we can do it for you.



HOUDE
ENGINEERING CORPORATION

BUFFALO, N. Y.

A DIVISION OF HOUDAILLE-HERSHEY CORPORATION

tory, under the direction of Ray A. Kirchmaier and Joseph T. Anderson, is equipped for general analytical work and will continue to analyze and test the hundreds of materials purchased or made by the company. Dr. D. M. Webb has been added to the staff for research in chemistry and one of his immediate problems will concern the electro deposition of various metallic substances as a backing for reflectors.

The manufacturing laboratory, under George G. King, is provided with facilities for making pitches, waxes, resins, polishing felts, and a multitude of other materials required in the Bausch & Lomb plant or for sale to outside industries.

British Improve Blast Furnaces

LONDON (Special Correspondence)—Total production of pig iron in the United Kingdom during 1936 amounted to 7,685,700 tons, compared with 6,424,100 tons in 1935, an increase of 19.6 per cent. The 1936 total is still below that of pre-war years (10,260,000 tons having been produced in 1913), but is a record for recent years.

During 1936, a steady improvement in blast furnace practice took place throughout the country. Hearth diameters were increased, stove equipment was modernized and auxiliary plants were enlarged. An interesting development in blast furnace operation is the system adopted at Corby of working the furnaces with a slag of lower lime content than usual with Northamptonshire ores, thereby producing an iron which has a higher sulphur content than normal, and purifying by means of sodium carbonate. This method of purification of pig iron outside, and not inside, the furnace has attracted attention from technologists abroad.

Sintering is being adopted to an increasing extent, and a plant completed during the year at the works of the Millon and Askam Haematite Iron Co., has allowed of a material increase in furnace output with a reduction in fuel consumption.

Steady development took place at a number of plants in connection with the more efficient use of fuel gas (blast furnace and coke oven) in iron and steel works, with the object of reducing the consumption of extraneous coal. The success which has attended this work,

which has now been in progress for some years, is shown by the fact that in 1924 the consumption of coal per ton of pig iron amounted to 1.95 tons, and in 1935 to 1.75 tons, while the consumption for steel-making purposes other than those of pig iron production were, for the same years, 1.26 tons and 0.84 tons respectively. While a proportion of this saving is due to the higher capacity of operation of iron and steel works today, it is mainly due to the adoption of

systems of measurement and control throughout the industry.

The Iron and Steel Industrial Research Council made good progress with several of its research activities last year. A number of blast furnace field tests were completed, in which investigations were made of a series of zones in the furnace, with a view to determining the temperatures and composition of gas and solids in the various zones, and thus enabling the factors that determine efficiency to be specified.

OVER 600 SIZES

JOHNSON
GENERAL PURPOSE
BRONZE BEARINGS

- Here is a complete bronze bearing service—as near as your telephone. The exact size you require—in any quantity. Machine finished, ready for assembly. Instantly available from representative stocks in every principal industrial center.

THE CORRECT ALLOY

S.A.E. 64—Copper 80; Tin 10; Lead 10 has been definitely proven to be the best bronze alloy for all general purpose applications. Johnson Bearings are cast in this alloy and give greater performance and longer Bearing life. Write for catalogue showing sizes and prices.

- SOLD THROUGH INDUSTRIAL SUPPLY DISTRIBUTORS

JOHNSON BRONZE
505 S. MILL STREET · NEW CASTLE, PA.

Sleeve BEARING HEADQUARTERS

British Coke Output Shows Sharp Increase

LONDON (Special Correspondence)—During 1936, industry in the United Kingdom continued its policy of striving for self-sufficiency with regard to coke requirements. New ovens were set in operation by the British Iron & Steel Co., at Cardiff, William Dixon at the Govan Ironworks, Dorman Long & Co., Cleveland, and the United Steel Companies at Workington. The new Dorman Long plant is the largest in the country, being capable of carbonizing 20,000 tons of coal per week, giving 13,000 tons of coke.

The annual production of furnace coke in Britain is about 12,000,000 tons, as compared with an annual demand for pig iron production of over 8,000,000 tons. The surplus, however, is more apparent than real, as about 1,750,000 tons of coke are exported annually, while 2,000,000 tons are consumed for domestic, foundry, and other purposes. It is estimated that the domestic demand is increasing at the rate of 500,000 tons a year. Consequently, there is an increasing stringency of coke supplies to the iron and steel industry and, as a result, a limit to the expansion of pig iron production. The problem is complicated by the growing scarcity in Britain of high-class coking coals. These are being steadily exhausted, and the problem has become one of national im-

portance. It has been suggested that high-grade coking coals should be reserved for coke manufacturers, the present market requirements of such coals other than for coke being met by the use of alternative fuels.

Brush Announces Cheaper Beryllium

THE Brush Beryllium Co., Cleveland, recently announced a new low price of \$23 per lb. for beryllium content, hitherto priced at \$30 per lb. and above, in making public the news of its entrance into the general market for beryllium-copper master alloy.

The company states that this relative price is only a beginning, and that its processes even now make it possible to produce and sell this metal in alloy form at prices lower than the above. What may ultimately be accomplished in the way of lower relative prices through these processes, the Brush engineers are not willing to predict, but they are confident that beryllium copper is certain of very much wider application.

Beryllium-copper alloys were originally produced by Lebeau in 1897, but it remained for Corson in the United States to discover their heat hardening capacity in the presence of added nickel. Almost simultaneously Masing and Dahl in

Germany discovered the heat hardening capacity of plain beryllium copper. The metal, which possesses unusual qualities of fatigue, corrosion, heat resistance, and non-sparking and high impact strength, is now in use in a wide variety of services ranging from watch parts to airplane propeller hub-cones, and from crow bars to delicate surgical instruments.

Serrick Corp. Buys John Lees Co.

SERRICK CORP., Defiance, Ohio, has acquired the John Lees Co., Indianapolis, which, when combined with the Acme Machine Products Co. at Muncie, Ind., now being operated by the Serrick Corp., will form the Muncie division of the Serrick Corp. Products of the John Lees Co. are rolled metal moldings and stampings, manufactured principally from stainless steel by a method of rolling a thin layer of stainless steel onto a soft steel base. The Acme company makes high carbon and alloy steels, heat treated screws, and automatic and hand screws. The entire Muncie division will employ about 850 persons.



..TRADE NOTES..

Appointment of W. R. Smith to the sales staff of its Los Angeles office, 812 Mateo Street, is being announced by the Lincoln Electric Co., Cleveland. Mr. Smith has been employed in the welding field for 10 years, the last three of which was as foreman on the Boulder Dam project.

Diamond Chain & Mfg. Co., Indianapolis, has appointed Smith-Courtney Co., Seventh and Bainbridge Streets, Richmond, Va., to act as distributors for Diamond roller chain and Diamond flexible couplings.

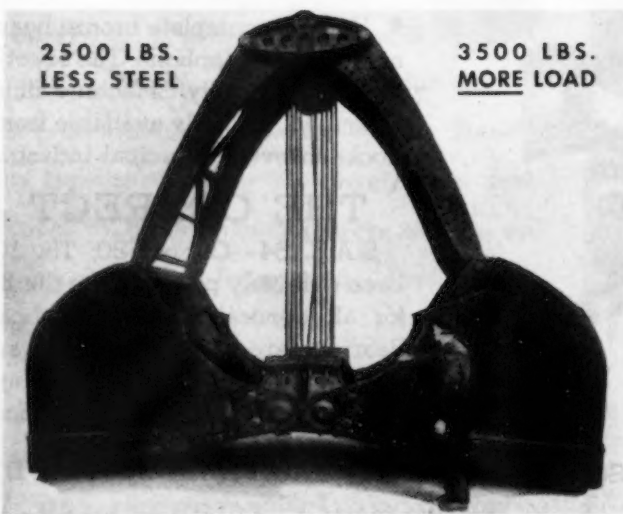
New York Belting & Packing Co., Passaic, N. J., has appointed Charles B. Scott Co., 119-123 Franklin Avenue, Scranton, Pa., as distributor of the company's complete line of mechanical rubber goods.

Cooke-Roberts Corp., Orange, Mass., has purchased Ezykut Tool Co., Northampton, Mass., maker of folding sickles, and will move equipment to Orange. Roy F. Cooke is general manager of Northampton company.

A STUDY IN EFFICIENCY

Through careful engineering and the use of modern alloys, Robins has increased their 10-ton Mead-Morrison Grab Bucket to over 11 tons capacity and at the same time reduced its weight about 2500 pounds. This means nearly 18% more material handled with the same expenditure of power. Estimate your power cost of moving materials and see what such a saving would mean to you on a dollars and cents basis.

Send for descriptive literature



ROBINS
MATERIAL HANDLING
EQUIPMENT

ROBINS CONVEYING BELT CO.
15 Park Row New York, N. Y.
Branches in Principal Cities



..PERSONALS..

GEORGE A. SLOAN, for the past 10 years prominently identified with the textile industry, has been elected a member of the board of the United States Steel Corp., New York. He was graduated from Vanderbilt University in 1916 and served in the World War. From



G. A. SLOAN

1922 to 1926 he was secretary of the Copper and Brass Research Association. Three years later he was made president of the Cotton Textile Institute, and as chairman of the Cotton Textile Industry Committee submitted to President Roosevelt the first code under the National Industrial Recovery Act.

CHARLES B. VEIT, who has been associated for a number of years with the Wright Mfg. Division of the American Chain & Cable Co., Inc., Bridgeport, has been appointed sales manager of that division, with headquarters at York, Pa. S. J. WOODWORTH has been made New York district manager, with office in the New York Central Building.

E. A. HURME, heretofore district manager of the Philadelphia office of the Clark Controller Co., has been made special field engineer for the Treadwell Engineering Co., Easton, Pa. After completing his electrical engineering work at the University of Michigan in 1914, he joined the Westinghouse Electric & Mfg. Co., and for the following 13 years was engaged in steel mill

engineering and sales work. He became associated with the Clark Controller Co. in 1927.

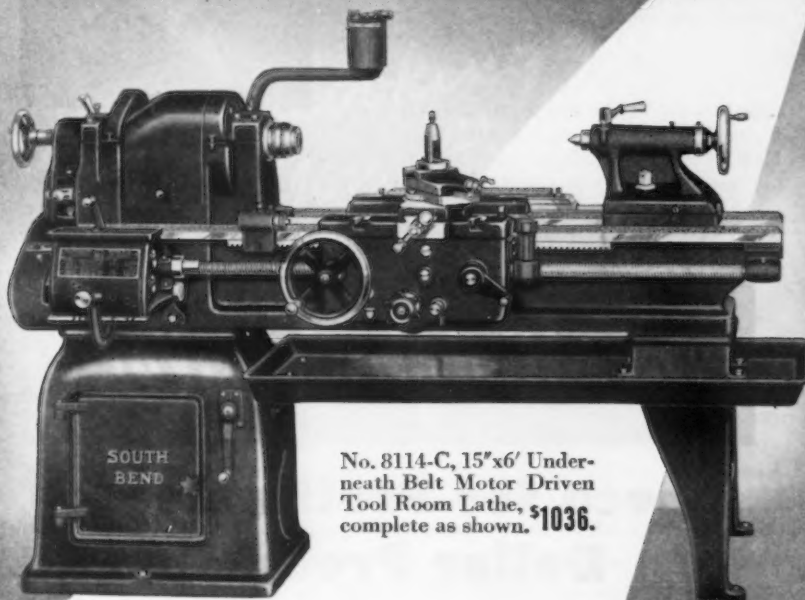
JULIAN M. AVERY has been appointed representative for Arthur D. Little, Inc., Cambridge, Mass., in the New York area, with office in the Graybar Building.

TOM M. GIRDLER, president, Republic Steel Corp., has been elected a trustee of Case School of Applied Science, Cleveland.

A. A. BIALAS has been appointed vice-president and general manager of sales, Wyckoff Drawn Steel Co., and E. C. ROCK has been appointed vice-president in charge of the Western division. Mr. Bialas and Mr. Rock have both been associated with the Wyckoff organization for a number of years.

ARCHIE T. COLWELL, director of engineering, Thompson Products, Inc., Cleveland, manufacturer of automobile and airplane valves, has

NEW 1937 SOUTH BEND *Precision* LATHES



No. 8114-C, 15'x6' Underneath Belt Motor Driven Tool Room Lathe, \$1036. complete as shown.

THE new 1937 Series of South Bend Back-Geared, Screw Cutting Precision Lathes with Double Wall Aprons and hardened and ground headstock spindles are recommended for the finest and most accurate work in the tool room, machine shop, manufacturing plant, and laboratory. Offered in sizes from 9" to 16" swing, in bed lengths from 3' to 12', Underneath Belt Motor Drive, Countershaft Drive, and Pedestal Motor Drive.

SOUTH BEND LATHE WORKS

596 East Madison Street

South Bend, Indiana, U. S. A.



South Bend
LATHES

WRITE FOR NEW CATALOG

Catalog No. 96 illustrates, describes, and prices the new 1937 Series of South Bend Precision Lathes in all sizes and styles. A valuable book for the shop man, engineer, and plant executive. Sent free, postpaid, upon request.

MODERN LATHES FOR MODERN INDUSTRY

been elected a vice-president of the company. He will supervise its engineering activities in Cleveland, Detroit and St. Catharines, Ont. His promotion was in recognition of his development work on engine and chassis parts. Mr. Colwell is prominent in the Society of Automotive Engineers and a member of its National Council. Graduating from West Point in 1918, he joined the Thompson organization in 1922 as a salesman.

♦ ♦ ♦

F. U. HARRIS, superintendent of the Bessemer, Ala., rolling mill of the Tennessee Coal, Iron & Railroad Co., has been transferred to the Fairfield works as superintendent of the plate and structural mills. C. H. BUMGARDNER, assistant superintendent of the Bessemer rolling mill, has been promoted to the superintendency, and V. C. SIMS has been appointed assistant superintendent.

♦ ♦ ♦

RICHARD L. CAWOOD, president, Patterson Foundry & Machine Co., East Liverpool, Ohio, has sailed for Italy, the Holy Land and the

Riviera for a stay of several months.

♦ ♦ ♦

R. I. SCHUPPENER, for the past 10 years department sales manager of the Wheeling Corrugating Co., Wheeling, W. Va., has been made



R. I. SCHUPPENER

general sales manager of the new building products division of Berger Mfg. Co., Canton, Ohio, a subsidiary of the Republic Steel Corp. He has been associated with the metal building trades industry all of his business life. He was born in Wisconsin, where his father was engaged in retail hardware, machinery and sheet metal business. After an association with his father, he became sales manager with the Milcor Steel Co. and later with the Klauer Mfg. Co.

♦ ♦ ♦

FRED SCHONBERGER, who has been associated with the cemented carbide field for several years, has been appointed as an additional representative in the Philadelphia territory for the Carboloy Co., Inc., Detroit.

♦ ♦ ♦

RICHARD C. STEWART, president and founder of the Stewart Iron Works Co., Covington, Ky., has been named chairman of the board. ROBERT S. STEWART has been made president; CHARLES L. COSTELLO, vice-president; W. S. RICH, secretary, and C. A. APLIN, treasurer.

♦ ♦ ♦

R. L. REGESTER has been appointed Pittsburgh sales representative, with office at 6823 Thomas Boulevard, by the Audubon Wire Cloth Corp., Philadelphia.

♦ ♦ ♦

H. A. STANLEY has been made district sales agent in North and South Carolina for the Roller-Smith Co., New York. He will make his headquarters at Charlotte, N. C.

♦ ♦ ♦

EUGENE P. FARRIS has been appointed manager of specialty sales for the Emerson Electric Mfg. Co., St. Louis, succeeding H. L. PARKER, JR., who has resigned.

♦ ♦ ♦

C. S. PITKIN and J. G. JOHNS have been placed in charge of the newly-established East Central and South Eastern sales districts of the Crane Co., Chicago. H. M. MOSS has been made sales manager at Pittsburgh, succeeding Mr. Pitkin. F. D. MORRISON, heretofore assistant manager at Birmingham, becomes manager, succeeding Mr. Johns. F. W. ZANDER, manager at Buffalo, has retired from active management because of ill health, but has consented to remain as special representative. G. E. ANDERSON, manager of the Lima, Ohio, branch, has been transferred to Buffalo as manager. E. R. HENNING has become the new manager at Lima. The retirement of H. L. WOOD, Sioux City, Iowa, also because of ill health, has moved T. R. BRADY, heretofore

Exact Weight Scales

Speed for Profitable Dollar Production

Every operation in American Industry is dependent upon speed for profitable dollar production. In parts selection three definite demands are made—unquestioned results, saving of materials and saving in man hours.



EXACT WEIGHT SCALES are used throughout general industry for check-weighing, parts selection, formulae control, balancing rotating parts, speed counting, laboratory research and ingredient uniformity. Built expressly for industrial plants, EXACT WEIGHT SCALES have been delivering trouble-free service in high speed production for more than twenty years now.

Write for information pertaining to *your* problems.

EXACT WEIGHT SCALE COMPANY

1000 W. Fifth Ave. Columbus, Ohio

"THERE IS NO SUBSTITUTE FOR EXACT WEIGHT"

manager of the Rockford, Ill., branch, to Sioux City in the same capacity. R. E. DOHERTY, in charge of the Portland, Ore., office, has been transferred to Rockford. E. B. MOOR, who has been assistant manager at Sacramento, Cal., has been promoted to the managership, succeeding S. S. DAY, who has retired. E. T. ROWE, formerly in charge at Syracuse, N. Y., has been made head of the Boston branch, to take the place of T. H. DAWSON, JR., who has resigned. A. H. BUCK, assistant manager at Pittsburgh, succeeds Mr. Rowe.

♦ ♦ ♦

E. A. STEIF, New York district sales manager of Otis Steel Co., Cleveland, sailed on the *Bremen* Thursday for a month's stay in Europe.

♦ ♦ ♦

E. K. WALDSCHMIDT, of the metallurgical department of the Jones & Laughlin Steel Corp., has been transferred to the district sales office at Detroit. Mr. Waldschmidt has been connected with that department since 1928 and will continue to represent it in the Detroit area. He attended Pennsylvania State College and Carnegie Institute of Technology, and is a member of the American Society for Metals and the American Welding Society.

♦ ♦ ♦

A. G. WHITTING has been appointed assistant to the general superintendent and S. M. JENKS has been named chief engineer of the Gary works of the Carnegie-Illinois Steel Corp.

Conference on Industrial Relations

A CONFERENCE on industrial relations at the Benjamin Franklin Hotel, Philadelphia, Feb. 9, 10 and 11, sponsored by the American Management Association will embrace such subjects as "The Technique of Wage Negotiation," "Employer - Employee Contracts," "The Economic Outlook for Labor Relations," and "Practical Management Attitudes Toward Industrial Relations." Scheduled to speak are W. L. Batt, president, S-K-F Industries, Inc.; Alvin E. Dodd, president, American Management Association; Virgil Jordan, president, National Industrial Conference Board; Clarence G. Stoll, vice-president, Western Electric Co., Inc., and chairman of the industrial relations committee of the National Electrical Manufacturers Association, and W. G. Marshall, vice-president, Westinghouse Electric & Mfg. Co.

Foundrymen to Meet At Michigan College

THE fifth annual sectional foundry conference of the American Foundrymen's Association has been scheduled for April 9 and 10, and will be held at Michigan State College, East Lansing, Mich.

This meeting, designed primarily to appeal to those connected with gray iron production in the automotive casting field, has established a reputation for bringing together leading authorities in the foundry field with discussions on metallur-

gical and foundry operating problems. "Testing of Metals with Particular Regard to Cast Iron," "Adaptability of Gray Iron as an Engineering Material," "Artificial Molding Sands," and "Core Making" will be discussed. Among the speakers will be R. Schneidewind, University of Michigan; W. E. Jominy, General Motors Corp.; S. C. Massari, Association of Manufacturers of Chilled Car Wheels; P. S. Lane, American Hammered Piston Ring Division, Koppers Co.; Dr. R. A. Smith, Michigan Geological Survey; and R. E. Aptekar, American Brake Shoe & Foundry Co.



IDEALLY adapted for purposes of drawing, stamping or forming, ThomaStrip is, today, the exclusive material specification of many metal fabricators. Products made of ThomaStrip are to be found everywhere . . . Favored because of fabrication economy with the assurance of product quality, the wide acceptance of ThomaStrip is the result of fidelity to specifications guaranteed by Thomas specialized production. . . . Available in bright finish or electro zinc or copper coated and in gauge, temper, edges and width to meet your requirements, ThomaStrip will prove to be the ideal material for your product, too. It's worth looking into. A Thomas representative will gladly cooperate with you.

The Thomas Steel Company • Warren, Ohio



Send for a free copy of the Thomas handbook of valuable information on cold rolled strip steel.

This Week on the Assembly Line

(CONCLUDED FROM PAGE 85)

production of passenger cars and trucks in the United States and Canada to 76,620, compared with 73,507 for the week ending Jan. 23, and with 90,195 in the corresponding period last year. The outlook is for production to continue close to last week's level as long as the General Motors strikes continue.

After losing several days because of the shortage of plate glass, Chrysler was able to resume almost full operations. Dodge worked six days last week, Plymouth five, after omitting Monday production. Both Graham-Paige and Packard lost four days because of glass shortages. First glass from Pittsburgh began arriving in Detroit on Wednesday of last week, and the return of Libbey-Owens-Ford to production has definitely erased all fear of further curtailment.

Union Loses Several Points in Glass Settlement

The Libbey - Owens - Ford settlement is interesting from several points of view. During negotiations, the Flat Glass Workers gave up their demands for a closed shop, union preference, check-off of union dues, and the inclusion of

Christmas or vacation bonuses in the union contract. The principal gain was an increase of 8c. an hour in hourly rates and the continuance of bonuses on the 1935 scale for approximately half the workers, who come under the group bonus plan. The net addition to the payroll will be about \$980,000. While there is nothing new in the fact that a contract was signed with the union, it points a possible trend in the automotive industry. Already there are three automobile plants which have signed agreements with the U.A.W. One of these contracts is so involved that it covers 16 pages and encompasses about every conceivable situation that might occur between the management and the workers. It is extremely doubtful, at this writing, that such a contract could be forced on General Motors. It is not unlikely, however, that Chrysler might be maneuvered into such a position, as it backs down inch by inch on demands made by the U.A.W. through the corporation's own creation, the works council.

Among the die shops in Detroit there is much fear and uncertainty as to the future. If the General Motors controversy should be ex-

tended for many months, it is more than likely that there would be no real 1938 program except perhaps for a few minor changes in body hardware and the adoption of new radiator grilles. There are rumors current that work is being jobbed out for General Motors English unit, but it is more than likely that this represents duplications of dies on the current domestic models. Part of General Motors' strategy seems to be to get into production at any cost. One reason, of course, is the humanitarian one of providing work for those who have been cut off the payroll through no choice of their own, and to this extent factory costs and efficiency bogies have been cast to the wind in an effort to spread work among as many people as possible. If operations can be resumed on the assembly lines, even on a restricted basis, it will do much to weaken the morale of the sit-downers and the union drive in general.

Graham-Paige Tractors

The important news of the week not related to the labor situation is that Graham-Paige will build a farm tractor to be marketed through Sears, Roebuck & Co. under its own trade name. The Graham-Paige supercharged six-cylinder engine will be used for motive power, and the inference is that most of the remainder of the unit will be assembled from components bought on the outside. Not long ago, Graham-Paige sold a great deal of surplus equipment to a Japanese automobile company, but the increased production on motors from this new source can probably be taken care of on present lines without the addition of much new equipment.

TRIPLE COMPRESSION SCRAP BALERS



STYLE
100 TC
(100 x 51 x 36)
and other sizes

Also Regular
**Double
Ram Presses**
in all sizes



GALLAND-HENNING

MANUFACTURING COMPANY

2724 S. 31st Street Milwaukee, Wisconsin

COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES AND PUMPS

Private Employment Up During December

EMPLOYMENT in the combined manufacturing and non-manufacturing industries surveyed by the U. S. Bureau of Labor Statistics increased by approximately 470,000 additional workers as between November and December, and aggregate weekly payrolls rose by over \$14,100,000. Employment on public works projects declined by some 180,000 workers, but there still were more than 2,951,000 workers attached to public payrolls as the year ended. More than 2,593,000 of these were engaged on projects operated by the WPA. Total payroll disbursements were approximately \$154,192,000, and the value of orders placed for materials exceeded \$51,624,000.

...OBITUARY...

WILLIAM K. HAWKS, executive engineer for the Weatherhead Co., Cleveland, manufacturer of screw machine and other products, was killed Jan. 26 when his automobile was struck by a train at a grade crossing. He was 40 years of age. After his graduation from Rensselaer Polytechnic Institute in 1918 he was employed as a chemical engineer by the Buick Motor Co., Flint, Mich., and later by the Fuller Transmission Co., Kalamazoo, Mich. He went with the Weatherhead Company in 1932.

♦ ♦ ♦

GEORGE F. COLLISTER, secretary and general manager of the Par-Brook Mfg. Co., Cleveland, died suddenly on Jan. 26, aged 53 years.

♦ ♦ ♦

WILLIAM P. BOWMAN, manager of the New York office of John A. Roebling's Sons Co., Trenton, N. J., died on Jan. 22.

♦ ♦ ♦

WILLIAM D. BENNETT, superintendent of the Carnegie-Illinois Steel Corp. rail mill at South Chicago, Ill., died Jan. 27, aged 51 years. He had been associated with the United States Steel Corp. for about 30 years.

Production of Diesel Engines Rose in 1935

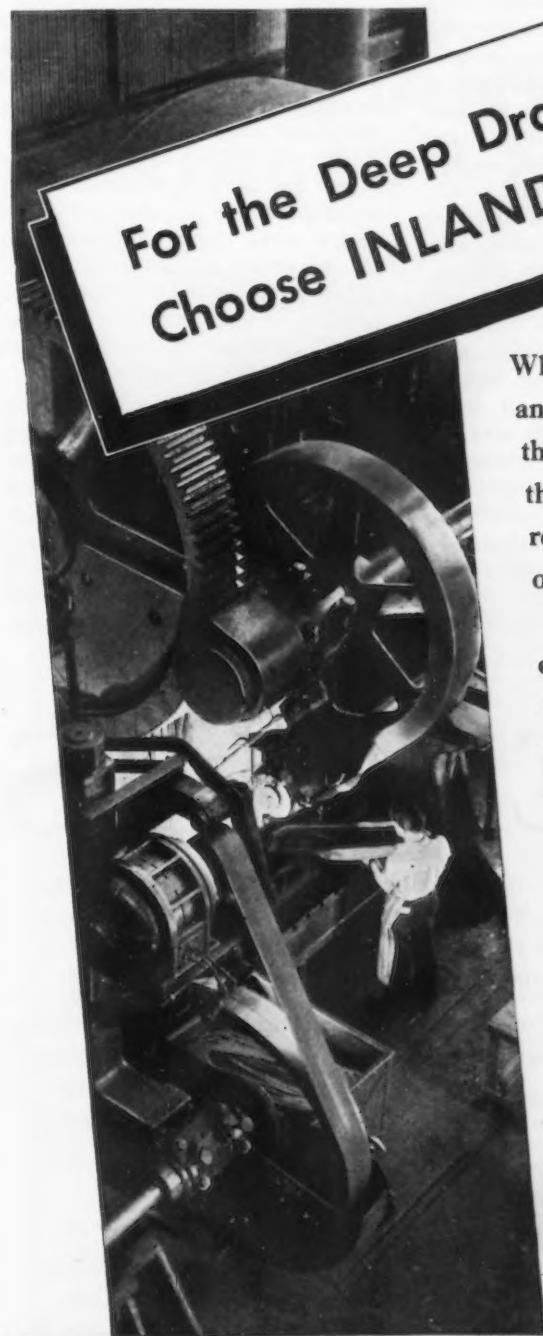
THE production of diesel and semi-diesel engines in the United States increased from 1473, with a total horsepower of 264,037, in 1931 to 6919, with a total horsepower of 958,485, in 1935, according to data collected in the recent biennial census of manufactures, reported by the Bureau of the Census of the Department of Commerce. The value of these manufactures in 1935 was \$18,245,359 against \$11,811,975 in 1931. Of the 6919 engines produced in 1935, 1123 were for marine use; 2478 were of the stationary type; 1253 were for tractor, aircraft and railway purposes; and 2065 were classified as of semi-diesel construction. Rated or normal horsepower capacity of these engines ranged from 10 or more per engine to over 1000 but under 5000. No diesel or semi-diesel engines rated at 5000 hp. or more were reported. The number of establishments

manufacturing such equipment in 1935 was 47, compared with 42 in 1931.

New Shop Lockers

FOR storing employees' clothing, Lyon Metal Products, Inc., Aurora, Ill., has placed on the market the Shoprobe here illustrated, believed to be unique in the locker field. This equipment can be

used in the general locker room or moved about to take care of various departments where conditions change periodically. The unit accommodates 20 persons with a separate, lockable compartment for personal belongings. Coat hangers are not removable and a chain may be supplied for locking coats to the hanger through the sleeve. The units are of heavy, all-steel construction and occupy floor space of 12½ sq. ft.



For the Deep Draw—
Choose INLAND SHEETS

When the press comes down and the deep draw begins — then it's the quality of steel that determines what the result will be, a perfect part or a reject.

With Inland sheets you can depend on a good rate of production. Year in and year out you are assured of Inland's uniform high quality.

Inland is equipped and organized to give you prompt personal service, and to work closely with you on every manufacturing problem.



INLAND STEEL CO.

General Offices: 38 South Dearborn Street, Chicago, Illinois • Offices in: Detroit - Kansas City - Milwaukee - St. Louis - St. Paul

Materials Handling as a Factor in Economic Production

(CONTINUED FROM PAGE 59)

anism would serve the purpose, but it is invaluable for the transfer of, say, the hot sinter coming from the calcining ovens of a cement plant.

10. *Overhead Trackage.* Two systems of overhead trackage are in use; the double rail, with rails widely separated, for crane service, and the single rail, for trolley service. In general, it may be said that the weight of the loads handled will determine the use of either system. Cranes are better adapted for heavy loads, and the trolley system for light loads. The trolley system is extremely flexible, for the single rail may run straight, or in curves in both the horizontal and vertical planes, and may have any number of switching branch-offs to serve all parts of the plant. The system may be installed with ease. The tracks of both the double and the single rail system, being mounted overhead, obviate the necessity of using valuable floor space for transportation aisles, as required by trucks, or for fixed installation equipment,

as required by conveyor systems. Many types of hangers for special uses are available for overhead trackage systems where vertical lifts are not required, or hoists may be used where both lifting and shifting is necessary.

11. *The Screw.* Certain types of material, mostly those of loose granular characteristics, may be handled most successfully in screw conveyors — consisting of wide-bladed screws of considerable length revolving in a semi-circular trough, pushing the material ahead as the screw turns. The principal advantage lies in the positive feed of material at a pre-determined rate, as of coal to a furnace fire. Screw conveyors are not used to move materials great distances.

12. *The Fan.* Blower and suction systems are generally developed from the fan, with the draught controlled through either fixed or flexible hose. One notable development of the suction system is used for the unloading of grain or loose powdered or granular material from cargo ships. Although a prin-

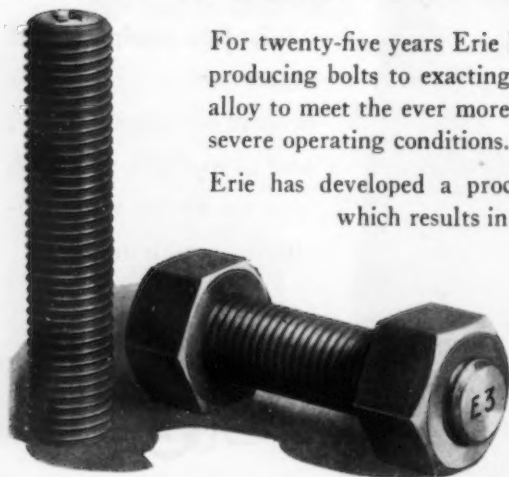
cipal use of the blower system is to remove chips and dirt from work being done on machine tools, a major development of this idea is the pneumatic tube message carrier system. The use of live steam is general in most ash removal systems; and in these systems, it should be noted that no fans whatsoever are used.

It is in the adaptation and combination of the above-described mechanical principles of lifting and shifting equipment to specific materials handling problems, that all planned, coordinated materials handling systems consist. To understand clearly the respective functions of all mechanical handling devices, and to arrange these functions into a *system* that will most effectively and economically move the materials of production from process to process throughout the whole plant is essential to any intelligent effort to further reduce the costs of production in any plant. For any particular problem, the processes of analysis must start with a study of production flow, including an effort to reduce all necessary movements to an orderly progression of materials and parts from point to point. The question of how the materials may best be handled at each stage should be considered in the light of the equipment available for the purpose, and the adaptability of that equipment to possible changes both in quantity of production and in methods of production. And, wherever two or more types of equipment are equally available, cost comparisons should be made, not only on the basis of the investment required and the savings in effort to be accomplished, but also in the matter of the flexibility of the equipment to any changes in the system which may later be required.

The next article in this series will take up in detail descriptions of particular equipment now available for the mechanical lifting of materials.

National Power Conference will hold its first 1937 meeting at the Hotel LaSalle, Chicago, Feb. 16, on the subject of "Power and Its Application in Industrial Plants." This will be an all-day meeting for power production and power application engineers.

ERIE BOLTS



For twenty-five years Erie Bolt & Nut Company has been producing bolts to exacting standards made of the proper alloy to meet the ever more rigid specifications imposed by severe operating conditions.

Erie has developed a process of manufacturing threads which results in great accuracy and smoothness

of thread, thereby eliminating, to some extent, seizure under high temperatures.

Write for two new close tolerance thread specifications developed by Erie.

ERIE BOLT & NUT CO.

ERIE, PENNSYLVANIA

Air Hygiene Foundation Offers Program in Fight Against Silicosis

A SIX-POINT program for protecting the health of industrial workers and a definite plan of medical research designed to help curb industrial disease are recommended to the Air Hygiene Foundation, Pittsburgh, by its medical committee in a report on "Silicosis and Allied Disorders."

The committee, headed by Dr. A. J. Lanza, chairman, has attempted to bring together for the first time a practical summary of what is known and what remains to be learned about dust disease.

The report outlines the following program of health control for the guidance of employers:

"A practical program of pre-employment examination of all workers exposed to dust containing silica is essential. Such examinations should include a complete physical examination of each individual, a careful history of past occupational exposure to dust, and a chest roentgenogram (X-ray).

"The value of such procedure may be summarized thus:

"1. Protection of prospective employees, who may have diseased lungs, from silica exposure.

"2. Discovery of hazardous jobs, as a result of finding the silicosis cases, in order to eradicate these hazards.

"3. Discovery of active and open cases of tuberculosis which are in contact with other employees, especially protecting the younger workers who are susceptible to contact infection.

"4. Discovery, through periodic examination of those with inactive tuberculosis, of any reactivation of their tuberculosis, so as to protect especially the younger employees. This also offers the infected individual a better chance of cure.

"5. Discovery of early cases of silicosis through periodic examination in order to give added protection from further excessive dust exposure.

"6. Determination, through periodic physical examination, of the effectiveness of the dust control program."

In recommending projects for medical research, the report states:

"There is no phase of employee health which concerns the employer more than does the question of dust diseases, and the ever increas-

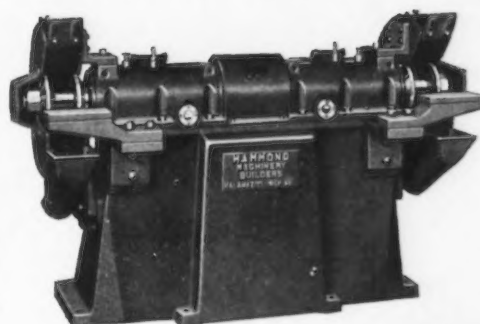
ing extent to which the employees' health is being made a responsibility of the employer demands that every available opportunity for increasing our knowledge be explored.

"The following research projects are listed, therefore, for the con-

sideration of the foundation, whose headquarters are at Mellon Institute:

"(a) Relationship between silicosis and tuberculosis. (b) The effect of other substances upon the action of silica in the body. It is claimed that some substances retard the action of silica on the lungs and that others seem to hasten the silica action. (c) Study of the mechanism by which silica exerts its injurious effects upon the body. Various explanations have

UNLIKE ANY OTHER GRINDER OR POLISHER



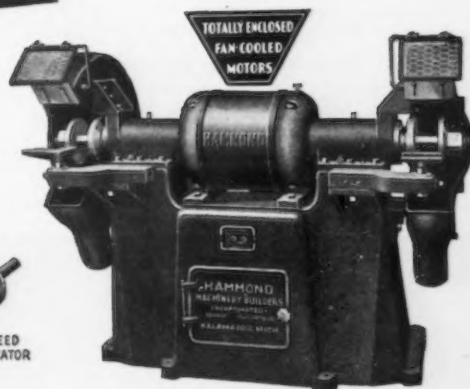
Hammond Heavy-Duty Grinders

Type WH—5-7½-10 H.P.
Four Bearings—Ball or Timken Roller Bearings. Totally Enclosed Fan-Cooled Motors.



Hammond Hi-Speed Snagging Grinder

Type WC—7½-10-15 H.P.
Single Spindle—1 Motor.
Type WWC—5-7½ H.P.
Double Spindle—2 Motors.
Totally Enclosed Fan-Cooled Motors Mounted Rear of Base. Multi V-Belt Drive.



Hammond Vari-Speed Polishing Lathes

Type RV—3-5-7½ H.P. Single Spindle
—Motor in Base. Multi-V-Belt Drive
—Heavy Duty. Four Ball Bearings on Spindle.

Incorporates Hammond Patented Variable Speed Drive—UNLIMITED SPEEDS. Also built with two spindles and two motors.

Write for Bulletins descriptive of the complete line of Hammond Grinders and Polishers.

Address Dept. 12.

Hammond Machinery Builders
INCORPORATED
KALAMAZOO, MICHIGAN, U.S.A.

EASTERN BRANCH: 148 W. 23rd Street, NEW YORK

been offered such as that the silica acts physically, or that the action is chemical or physio-chemical. (d) Research in the technic of roentgenography. Since it appears that to an ever increasing extent pre-employment medical examinations will include chest roentgenograms, a man may be hired or rejected on the basis of his X-ray film. Therefore, the very best technic that can be evolved is the least with which industry can be satisfied."

The report involved the weighing of findings gleaned in a number of industries, in hospitals and in research centers here and abroad. It concludes that on the basis of present knowledge, nine points are definitely known regarding silicosis. They are:

"1. Silicosis results from the inhalation of dust containing free silica.

"2. The time required for development of silicosis varies from a few years to 20 or more, depending on the concentration of silica particles in the air and the length of exposure.

"3. Beginning silicosis is recognizable only by properly taken roentgen films (X-rays) of the chest.

"4. Associated with silicosis is a marked predisposition to tuberculosis.

"5. Silicosis can be prevented by protecting the industrial worker from inhaling silica dust. This may be accomplished by engineering measures.

"6. Concentrations to which dust must be reduced in order to be safe have not been absolutely determined.

"7. Industrial dusts, containing silica, are frequently not all silica, being mixed with other materials. Some of these substances may alter the silica action in the body.

"8. Asbestos, a silicate, is the only dust other than free silica which has been shown to cause lung fibrosis and disability.

"9. Simple, that is, uncomplicated, silicosis as seen in industries in the United States, causes relatively little severe disability."

Issues Booklet on Apprentice Training

A 32-PAGE booklet has been published by the Cincinnati Milling Machine and Cincinnati Grinders, Inc., explaining in detail the essentials of that organization's apprentice training school.

A policy of the company since its beginning, the course consists of "carefully planned work in machine shop practice under the supervision of experienced journeyman instructors and an educational program conducted in cooperation with one of Cincinnati's educational institutions." The present training program is so arranged that young men with all degrees of preparation ranging from high

school to college graduates may be enrolled.

Included in this booklet are the courses to be studied by the various groups undergoing training with the time to be spent on each subject. Scholastic requirements are also listed.

"All work is taken from regular production schedules and is of a practical nature and value, such as: Standard production of a simple nature; new tools, jigs and fixtures; tool repairs; overhaul of shop machines; petty orders (repair parts for former machines); and miscellaneous salvage work from the entire plant."

Other information for apprentices is also included, such as the duration of the apprenticeship, compensation, vacation provisions, bonuses and tools, etc. Regular apprentices who complete the course are given a certificate of apprenticeship, which includes the length and character of apprenticeship and is signed by the president of the company, works manager and supervisor of apprentices.

Electroplaters Meet In London, March 3

THE first international conference on the electrodeposition of metals will be held in London, England, on March 3 and 4. Papers have been accepted from Belgium, Holland, U.S.S.R., Switzerland and the United States. A list of the American authors and papers follows: Arthur Phillips, professor of metallurgy, Yale University, "Crystal Structure of Copper Electrodeposits"; Walter Meyer, electrochemist for General Electric Co., "Developments in the Electrodeposition of Platinum Metals"; K. Schumpelt, chief electrochemist of Baker & Co., Inc., "The Cyanide-Cadmium Plating Solutions"; Gustaf Soderberg, chief chemist of Udylyte Co., "Methods of Determining Thickness of Electrogalvanized Coatings"; A. K. Graham, assistant professor of electrochemistry, University of Pennsylvania, "Studies Evaluating the Brightness of Electrodeposits"; B. Egeberg, chief metallurgist of International Silver Co., and N. Promisel, electrochemist for the International Silver Co., "A Résumé of Silver Plating"; Frank C. Mesle, research engineer for Oneida Ltd., "Electroplating—American Practice"; and George B. Hogaboom, engineer for Hanson-Van Winkle-Munning Co., an electroplating paper dealing with a subject yet unannounced.



Jones & Laughlin Employees Move To Oust Lewis Representative

PITTSBURGH, Feb. 2.—Indicating the sharp line of demarcation between adherents of the employee representation plan and pro-Lewis sympathizers, a move is on foot by employee representatives of the Aliquippa works of the Jones & Laughlin Steel Corp. to oust Paul Normile, chairman of a newly organized Pittsburgh-Aliquippa CIO council, who recently went over to the Lewis side. A petition has been circulated in the department which Mr. Normile represents and enough names have been obtained for his removal. An attack on the validity of the petition has been made by pro-Lewis sympathizers who charge that the management inspired the petition in order to get rid of a Lewis trouble maker. However, leaders of the employee representation plan deny that the Jones & Laughlin management had any part in the movement to recall Mr. Normile.

Equally significant was a demand for the resignation of all Carnegie-Illinois Steel Corp. representatives supporting John L. Lewis's "ambition to become a dictator," which was sponsored by workers at Carnegie's Isabella plant at Etna, Pa.

The resolution criticized the C.I.O. leader severely for his part in the General Motors strike, declaring that "Mr. Lewis has brought the taint of dishonor to all American workmen by his suggestion that the United States Government could be bought through the medium of a \$500,000 campaign fund contribution." The resolution also read: "Due to the fact that Mr. Lewis and his cohorts have shown an utter disregard for the principles of a majority rule and have been guilty of illegal seizure of property, we call upon all employee representatives who subscribe to Mr. Lewis's ambition to become dictator of the country to resign as employee representatives at once."

On Feb. 9 and 10, the Pittsburgh district general council, composed of employee representatives from 18 Carnegie-Illinois plants in Pittsburgh-Youngstown district, will consider a number of questions, the discussion of which will have an important bearing on future working conditions. Among the subjects to be brought up are: Payment of pensions monthly instead of every 90 days; a minimum pension of \$60 a month, with \$100 a month maximum; new vacation

plan; time and a half for overtime on Sunday; 20 per cent increase to be paid on all packs of 12 sq. ft. per sheet or under, for roughing and finishing mills and shear crews. The committee will also take up matters relative to seniority rights, grievance committee procedure, and payment of

extra compensation for Sunday work.

Meanwhile, the Steel Workers' Organizing Committee has made plans for a national conference of negro organizations in support of the steel drive to be held in Pittsburgh on Feb. 6. The SWOC also claims the establishment of several new Amalgamated Union lodges in and around the Pittsburgh district. It is understood that the organizing of new lodges is being pushed preliminary to the holding of a national convention of



AT YOUR SERVICE

* Long years of experience with metal cleaning in all its forms has given the Service Representatives of The J. B. Ford Company unusual ability to be of service wherever a metal cleaning problem exists.

* Wyandotte Metal Cleaners are produced to fill every metal cleaning need. They are the result of careful study and analysis over a period of more than thirty years.

* The unusual ability of The J. B. Ford Company and its Service Representatives to be of assistance to you is at your disposal.

Wyandotte
Clean "Chemically" Clean
Metal Cleaners

THE J. B. FORD COMPANY

WYANDOTTE, MICHIGAN

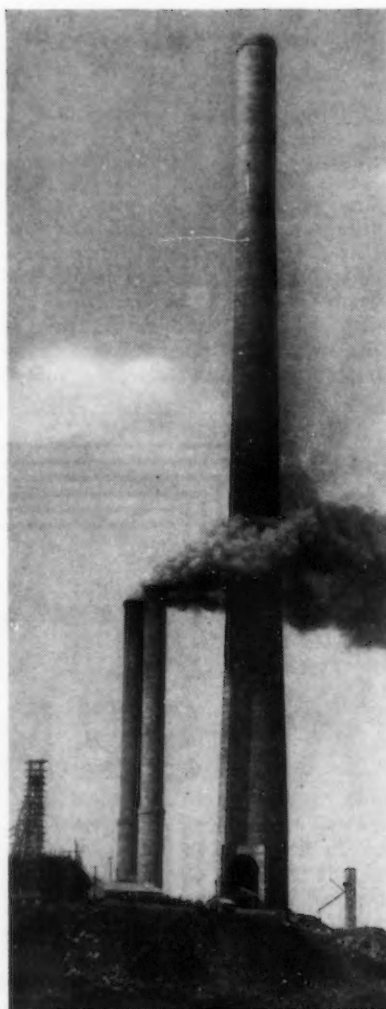
steel workers affiliated with the SWOC and the drafting of recognition demands on the American Iron and Steel Institute. According to an SWOC official, a national convention for the purpose of drafting the demands will be held about April 1.

World's Highest Chimney in Korea

IN the hilly country of Chinnampo, Korea, stands what is said to be the highest chimney in the world. Extending 618 ft. into the sky from the bottom of the foundation, the structure was erected for the Nippon Mining Co. by the Oriental Compressol Co., Tokio, using a system of reinforced concrete chimney construction and unit forms developed by the Weber Chimney Co., 332 South Michigan Avenue, Chicago.

The chimney, which serves a gold smelter and requires such unusual height to prevent destruction of vegetation by smelter gases, required 3200 cu. yd. of concrete and 120 tons of steel reinforcing bars in the foundation, and 4400 cu. yd. of concrete and 200 tons of bars in the shaft. The reinforcement in the latter consists of vertical bars and horizontal rings. The thickness of the shaft at the base is 37 in. and at the top 7 in. Inside diameter at the top of the shaft is 25 ft. A vertically and horizontally reinforced lining 6 in. thick lines the chimney for 180 ft.

The foundation, which is 18 ft.



thick and circular with a diameter of 97 ft., required one month's work for completion, while five months were required for the shaft.

United Engineering Acquires Interest in British Concern

THE United Engineering & Foundry Co., Pittsburgh, has acquired a substantial interest in Davy & United Engineering Co., Ltd., of Sheffield, England, which has been formed to acquire the business and assets of Davy Brothers, Ltd., manufacturer of rolling mill machinery in England since 1880.

The new company will have a capitalization of 1,000,000 shares of one pound par value. Shares of the old company have been listed on the London Stock Exchange.

K. C. Gardner, vice-president of United Engineering & Foundry Co., has been elected a director of the new English company.

Davy & United Engineering Co. will proceed immediately with the construction of substantial additions to its plant in Sheffield, installing new machinery and equipment of the modern type to make the plant both the largest of its kind in England and the greatest of its type in size in any country outside of the United States.

With equipment comparable to that of machinery companies in the United States, the English company will build rolling mills based on designs of the United Engineering & Foundry Co.

At present the Davy & United Engineering Co., Ltd., is constructing a substantial part of the hot and cold strip mills for Richard Thomas, Ltd., the American part of which contract is being filled by United Engineering & Foundry Co. The English concern has just received a contract for merchant mills to be installed in Turkey and also has several large unfilled English contracts.

Nippon's Stainless Steel Is Evershining

THE Department of Commerce, Washington, has prepared a brief report covering the characteristics of Nippon Evershining Steel produced by Nihon Jyokiko Seikoshu Goshi Kaisha of Japan. This company also produces stainless steel under the trade name of Constahl and Bristahl, and claims they are acid proof, heat proof and alkali proof. Interested American companies may borrow the report by addressing a request to the Department of Commerce.



PERFORATED METALS
INDUSTRIAL, ARCHITECTURAL, DECORATIVE

Industrial Screens for all purposes.
 Cane and Machinery Guards.
 Grilles to meet all requirements for heating,
 ventilating and air conditioning.
 Registers and Cast Grilles.

DIAMOND has a national reputation for perforated metal products of the better quality.

DIAMOND MANUFACTURING CO.
 Wyoming, Penna.
 Sales Representatives in all principal cities.

29,000 Tons of Steel For Two Battleships

WASHINGTON, Feb. 3.—Approximately 20,000 tons of armor plate and special treatment steel and about 9000 tons of medium plates, shapes and bars will be required for each of the two battleships to be constructed under the 1936 naval building program. One of them will be built in a private yard and Secretary of the Navy Swanson has announced that advertisement for bids for its construction will be made about March 15.

Allocation of two destroyers and one submarine to Navy yards was made last week, and these vessels with the battleships complete the 1936 program. One destroyer will be built in the Philadelphia Navy Yard and one in the Norfolk, Va., Navy Yard. The submarine will be built in the Mare Island, Calif., Navy Yard.

Galvanizers to Hold Annual Convention

THE American Hot Dip Galvanizers Association, Inc., will hold its annual meeting on Feb. 11, at the Hotel Commodore, New York. Annual elections of the board of directors and officers for the ensuing year will take place at this meeting, and many subjects of interest to the members and industry at large will be discussed. Invitations will be extended to all known concerns in the entire job galvanizing metal coating industry.

Technical Displays At Johns Hopkins

THE 25th anniversary of the founding of the school of engineering of Johns Hopkins University will be celebrated by a three-day program of addresses, technical discussions, informal meetings and a diversified exhibit of modern engineering developments. Opening on Feb. 19, the celebration will reach its high point with an address by Dr. Karl T. Compton, president of the Massachusetts Institute of Technology, at the university's commemoration day exercises on Feb. 22.

Research methods and materials as well as the instruction facilities of Johns Hopkins University may be observed by the public as a part of the engineering show. The electrical, mechanical, hydraulics and

highway laboratories will be open, and interesting experiments will be in progress. Routine tests of highway materials and the methods for determining stresses and deflections on a laboratory model of a radically new type of tubular steel bridge pile will be demonstrated. Models of a coke oven battery, sanitary engineering equipment and a complete dial telephone system will be operated. High voltage current will be generated and made to show the effect of lightning on a modern power transmission line.

Further displays will include an industrial adaptation of the photoelectric cell; the magnetic investigation of electric welds and magnetic tests for flaws in steel tools; commercial methods of removing sulphur from gases and laboratory experiments in combustion; a demonstration of the physical changes in steam in a turbine nozzle; a new form of bearing based on pure fluid lubrication, shown for the first time; and actuated dioramas of flood control and slum clearance projects.

A New Booklet on Resistance Welding...

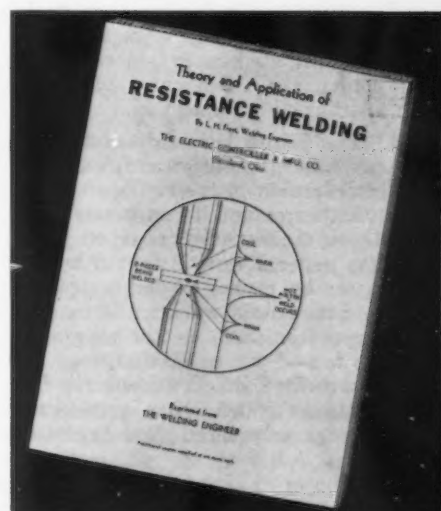
(Spot, Butt and Projection)

Single Copies

FREE

to
manufacturers
or their
representatives

Additional copies supplied
at ten cents each



THIS BOOKLET describes: *Welding Machines and Methods—Transformer capacity and pressure requirements—Data for butt and projection welding—Selection of electrodes and electrode material—Spot welding of coated sheets, ferrous and non-ferrous metals.*

Now available . . . in a new 16-page booklet, just off the press . . . modern, up-to-date facts and information on spot, butt and projection welding—conveniently compiled for quick reference. We know the information contained in this handy booklet will prove extremely useful and helpful to every manufacturer employing or contemplating the resistance method of fabrication. Merely fill out and mail the coupon below for your copy. Only a limited supply has been printed—be sure to mail coupon today.



HEAVY DUTY MOTOR CONTROL
FOR CRANES, MILL DRIVES AND
MACHINERY • BRAKES • LIMIT
STOPS • LIFTING MAGNETS AND
AUTOMATIC WELD TIMERS

THE ELECTRIC CONTROLLER & MFG. CO.

2698-A East 79th St., CLEVELAND, OHIO

Gentlemen:

Please send me your new booklet containing useful data and facts on Resistance Welding.

NAME

COMPANY

ADDRESS

G. M. Strikers Enjoined; Lewis Threatens Steel Industry

DETROIT, Feb. 2. — Judge Paul V. Gadola granted an injunction at Flint requiring officers of the UAW to withdraw strikers now holding General Motors plants and to cease all picketing. Action must be taken within 24 hr. The sheriff is proceeding to serve writ.

WASHINGTON, Feb. 2. — President Roosevelt today declined to comment on the General Motors strike situation. When asked what the Federal Government could do now that an injunction has been issued against sit-down strikers in General Motors plants, the President said that is another "iffy" question.

The White House from the outset has studiously avoided direct intervention in the strike situation. Whether or not it can permanently do so is a matter of speculation. The general view is that if trouble arises by means of demonstrations by automobile workers' union representatives the matter may again be forced upon Washington, this time before the President for final settlement. There was considerable concern expressed that agitation

will develop the necessity of mediation in Washington. This apprehension grew out of the departure of Chairman John L. Lewis of the committee for industrial organization for the strike area this afternoon and his announced purpose of holding widespread mass meetings of workers.

Immediately, however, the problem lies directly at the door of Governor Frank M. Murphy of Michigan, who is responsible for seeing that the terms of the injunction together with those barring picketing are fulfilled.

Secretary Perkins Has Not Yet Given Up Hope

Riots which broke out yesterday afternoon at a Chevrolet plant in Flint, Mich., have obscured but not stopped further efforts to negotiate peace terms in the General Motors Corp. strike, Secretary of Labor Frances Perkins said at a press conference shortly after learning of the riots in a telephone talk she had with Governor Murphy of Michigan. Miss Perkins made it known that efforts again had been underway, in cooperation with Governor Murphy, to explore

possibilities of peace, despite the second collapse of attempted negotiations with President Alfred P. Sloan of General Motors Corp. last Friday. She announced no new plans to resume negotiations though she said she and the Governor of Michigan are still "working together completely." Nothing, she said, can be done in Washington about the riots. Referring to them as being very serious, to both local and State authorities, she stated they were a problem for local authorities. However, she announced that Labor Conciliator John F. Dewey had been dispatched to Flint as an "observer" to see what he can do. Assistant Secretary of Labor Edward F. McGrady, she said, had been asked to remain in Washington for at least 24 hr., because she felt he could do more here than at the scene of the trouble.

When asked if she and Governor Murphy had made progress in the effort to resume peace negotiations, Miss Perkins replied they had but that it was "not marked." Both Governor Murphy and the Department of Labor are still trying to break the deadlock.

She declared that the strike situation had not been put into any one's particular lap, either in Washington's or in Michigan's lap, but that "all of us are trying to be mutually helpful and are working together."

She denied reports that she had attempted to get into touch with the duPonts as the largest stockholders in General Motors. She also stated that she had no evidence that Mr. Sloan or other General Motors officials had referred to the duPonts for advice.

Governor Murphy, Miss Perkins said, had told her of the true facts as to the riots. She said there were two versions as to the riots. One, it was stated, was that trouble started when a picket line had been sent to the Chevrolet plant, "contrary to practice" and another was that they followed a quarrel between union and non-union workers in the plant.

John L. Lewis Issues Warnings to Steel Industry

Again dragging in the steel industry in his efforts to unionize industries of the country, John L. Lewis, chairman of the Committee for Industrial Organization, returned to Washington Monday from New York and declared the industry was backing the General Motors Corp. in the latter's strike situation and roared about the possibilities of war between capital and labor. His blast in Washing-

Low Sulphur Fuel Oil

For Heat Treating Steel, Copper and Non-Ferrous Metals; for Metal Refineries and for Glass Works. Something new in Oil for Industrials requiring a Low Sulphur Product.

Delivery by Tank Steamer, Barge, Tank Car, and Tank Wagon.

Convenient Terminals at New York, New Jersey and New England Ports.

Bennett Oil Company, Inc.



366 MADISON AVENUE

NEW YORK

Telephone Murray Hill 2-4100

ton was in the nature of an offshoot of a fervid effort he delivered in New York Sunday when he addressed a forum conducted by the magazine *Common Sense* and took occasion to notify the steel industry that it may as well know now as later that collective bargaining is going to come to it soon. His Washington blast associating the steel industry with General Motors, Morgan and duPont interests was a mere repetition of similar previous outbursts, some of which added the coal industry to the list. In other CIO quarters the steel industry also was marked for further attack with the declaration that the motor strike was only a "sideline engagement, far to the left" with the unionization of the steel industry as the main objective of the CIO drive.

Lewis in his New York address

January Pig Iron Output 3,212,135 Tons

ESTIMATED production of coke pig iron in January totaled 3,212,135 gross tons, compared with 3,115,037 tons in December. The daily rate in January, at 103,617 tons, was 3.1 per cent over the 100,485 tons in December. This gain was made in spite of the fact that many furnaces along the Ohio were out temporarily from three to 10 days because of the flood. There were 170 furnaces in blast on Feb. 1, the same number as on Jan. 1.

Iron, Steel Exports Highest Since 1930

WASHINGTON, Feb. 2.—The highest since 1930, exports of iron and steel products, exclusive of scrap, in 1936 totaled 1,221,663 tons, valued at \$88,062,559, according to a preliminary report of the Metals and Minerals Division, Bureau of Foreign and Domestic Commerce. Exports in 1935 were 959,646 tons, valued at \$65,363,748. Scrap exports last year aggregated 1,941,031 tons, valued at \$24,681,634, compared with 2,103,959 tons, valued at \$22,949,070, exported in 1935.

Featuring the outgoing movement of steel last year were exports of tin plate, which rose to 235,583 tons, valued at \$23,510,826,

went so far as to charge that the steel industry was in a conspiracy not to supply the Government with steel. This picture was conjured up by Lewis because of the refusal of steel makers to bid under the Walsh-Healey Government Contracts Act. The Navy Department itself has requested for exceptions under the act in order that it can obtain steel supplies.

It was evident Lewis on his return to Washington was deeply roiled over the second collapse of negotiations Secretary of Labor Perkins attempted to develop in a conference last Friday with President Alfred P. Sloan, Jr., of General Motors and was likewise in a rage over the General Motors court move in Flint, Mich., to obtain an injunction to compel sit-down strikers to evacuate Fisher Body plants in Flint.

Among the furnaces blown in during the month were: Oriskany, of the Lavino Furnace Co., and Hubbard, Youngstown Sheet & Tube Co.

Furnaces blown out or banked include Bethlehem "B," Bethlehem Steel Co., and Ashland furnace, American Rolling Mill Co.

(Complete tabulations will appear in next week's issue).

almost double similar exports in the preceding year. There was also notable expansion in foreign shipments of "other plates" last year, followed by black steel sheets, plain shapes, heavy rails, hot rolled strip steel and unlined tanks. Declines were recorded in shipments of ingots, galvanized steel sheets, car wheels and axles, welded galvanized steel pipe and welded black steel pipe.

Exports of iron and steel products in December, 1936, amounted to 135,130 tons, valued at \$9,998,927, compared with 127,255 tons, valued at \$8,648,974 exported in the preceding month and 90,889 tons, valued at \$6,402,022, in December, 1935. Tin plate represented the largest volume of tonnage exported last December.

Scrap exports in December were

109,026 tons, valued at \$1,616,473, compared with 76,042 tons, valued at \$1,315,650, shipped abroad in November. In December, 1935, scrap exports were 148,380 tons, valued at \$1,834,143.

Rioting Breaks Out; Militia Rules Flint

DETROIT, Feb. 2. — Violence broke out anew in Flint on Monday afternoon and night during time briefs were being presented in General Motors' injunction suit to evict sitdown strikers from two Fisher Body plants. Trouble began when picket lines started molesting workers leaving Chevrolet plant at start of afternoon shift.

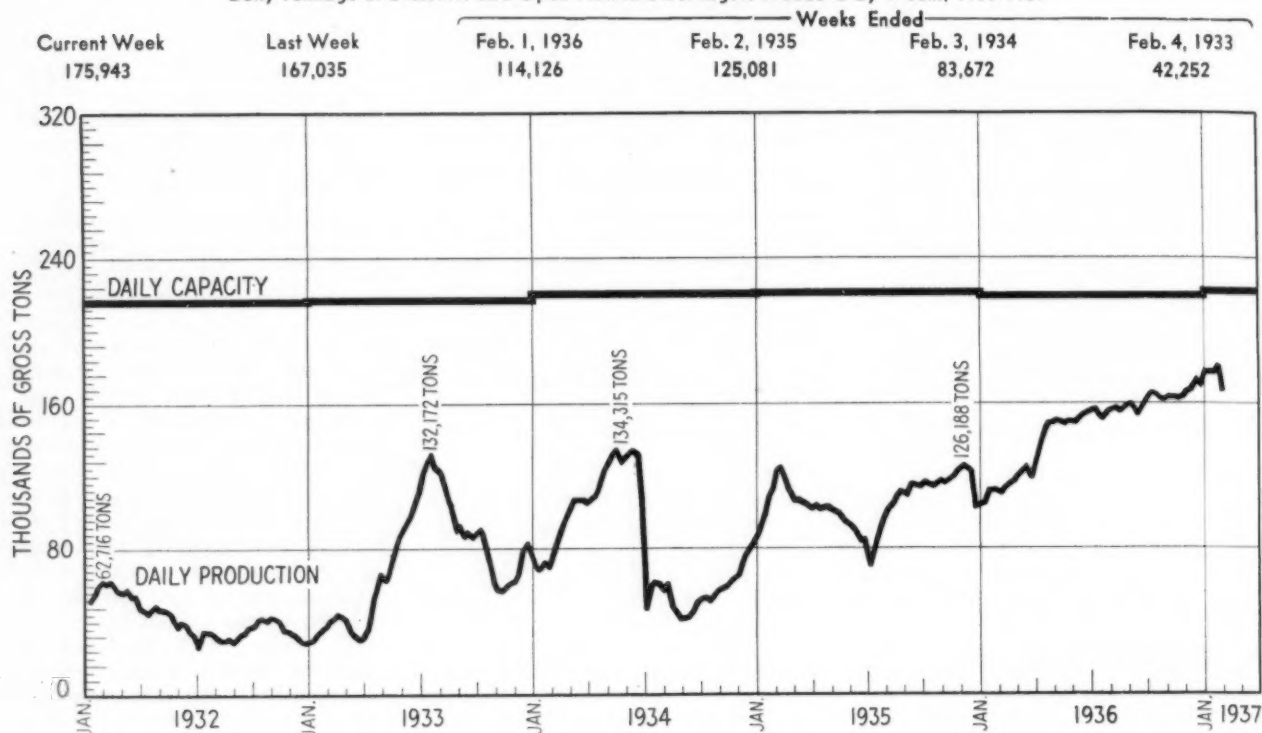
As the situation became tense 1200 National Guardsmen left their quarters and made a cordon of bayonets around the Chevrolet plant. No one can get through the line without a military pass and entry of food is being denied strikers in the motor plants. These buildings are largely wood construction and strikers threaten to tear them up in order to keep warm, although the company insists steam is on if sitdowners knew how to operate valves. A large number of broken windows, many damaged by women pickets armed with clubs, did not help the heat situation on a bitter cold night. Tension is at high pitch as guardsmen bivouac in plant No. 9 adjacent to plant No. 4 held by strikers.

A plan to send Dodge and Chrysler union members to Flint as pickets has been cancelled now that the militia is in command of situation. All operations at Chevrolet have ceased, but Buick continues operations with 2000 men, no pickets.

Reflecting an increase of 44.7 per cent, the number of wage earners in the wire and wire products industry rose to 46,716 in 1935 from 32,289 in 1933, according to the Bureau of Census. Making a much sharper gain, wages rose to \$49,877,968 from \$28,475,915, a gain of 75.2 per cent. The value of plain wire made in 1935 for sale and for interplant transfer was \$122,728,405 and that of fabricated wire products was \$224,741,173, representing increases of 44.1 per cent and 51.9 per cent, respectively, over corresponding figures for 1933.

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1933-1937



Figures for the current week are not indicated on the chart until the following week.

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended		
			Jan. 2, 1937	Feb. 1, 1936	Feb. 2, 1935
Pittsburgh	82.0	80.0	78.0	36.0	42.0
Chicago	78.5	78.5	77.5	52.5	67.0
Valleys	78.0	76.0	81.0	60.0	63.0
Philadelphia	56.5	56.5	56.5	40.0	36.0
Cleveland	79.0	79.0	77.0	66.0	67.0
Buffalo	81.0	81.0	84.0	30.0	46.0
Wheeling	95.0	46.0	94.0	70.0	95.0
Southern	74.5	77.5	69.5	59.0	29.0
Ohio River	19.0	15.0	95.5	75.0	95.0
Western	91.5	91.5	76.5	40.0	45.0
St. Louis	78.0	75.0	75.0	73.0	33.0
Detroit	93.0	93.0	100.0	100.0	100.0
Eastern	95.0	95.0	85.0	40.0	50.0
Aggregate	79.0	75.0	79.5	50.5	56.0
Average Year to Date	78.8	78.8	79.5	50.4	48.9

Weekly Booking of Construction Steel

FROM THE IRON AGE

	Week Ended				Year to Date	
	Feb. 2, 1937	Jan. 26, 1937	Jan. 4, 1937	Feb. 4, 1936	1937	1936
Fabricated structural steel awards.....	18,910	58,500	19,650	16,400	140,035	97,900
Fabricated plate awards.....	4,175	3,260	2,725	0	15,015	46,025
Steel sheet piling awards.....	4,800	0	1,950	0	8,950	3,600
Reinforcing bar awards.....	4,030	1,275	0	3,725	14,250	65,935
Total Lettings of Construction Steel....	31,915	63,035	24,325	20,125	179,250	213,460



...SUMMARY OF THE WEEK...

... Steel production regains most of losses due to floods.

o o o

... General Motors releases steel orders as some plants resume work.

o o o

... Heavy buying of steel for railroad cars and construction.

WITH the resumption of steel making by units in the Pittsburgh, Wheeling and Youngstown districts that were affected by flood conditions, the ingot production rate for the country has risen to 79 per cent from an estimated 75 per cent a week ago. Mills at Ashland and Newport, Ky., and Portsmouth, Ohio, are still idle, but the Middletown, Ohio, plant, where operations had been reduced to 50 per cent because of diversion of power, has stepped up to 75 per cent, with capacity production again in sight.

The Pittsburgh district has reached an 82 per cent rate, the peak that was attained the week before the flood, and the Wheeling district has quickly snapped back to a 95 per cent operation, one point higher than in the week preceding the flood. The Youngstown district has advanced to 78 per cent from 76 per cent last week. The southern Ohio output is estimated at 19 per cent, only a slight rise over a week ago.

As flood waters recede the extent of the damage to industrial plants, dwellings, bridges and highways will become apparent. Preliminary surveys indicate that there will be an urgent need for considerable steel for quick repairs and a much heavier demand later on for reconstruction work and flood control projects on a large scale. Foundries in the Cincinnati area have been hard hit and it may be weeks before all of them resume production, thereby causing delays in shipments of machine tools, for which orders have piled up heavily in recent months. Steel stocks of many jobbers in the Ohio Valley have been flooded, and new shipments in large volume will be required together with reconditioning of damaged material at the mills.

RESUMPTION of work at several of the plants of the General Motors Corp. has resulted in the release of suspended tonnages of some products, particularly sheets and strip. Meanwhile,

other automobile companies are straining for higher production, Ford having reached 6000 cars a day. That company has inquired for 80,000 tons of square and round bars and slabs, the latter for processing on its own sheet mills. Total output of motor cars is moving up slowly, having gained a little more than 3000 units last week.

There was heavy ordering of plates, sheets, bars, structural shapes and sheet piling in the last few days of January for identified construction projects, including railroad equipment, owing to the requirement of steel companies that formal contracts for such work be entered into by Jan. 30 against price protections given in December. The amount of business that was thus driven in probably totaled several hundred thousand tons. In railroad equipment alone about 200,000 tons was entered, as a number of roads closed for upward of 14,000 cars plus about 4200 that will be built in railroads' own shops. Unfilled orders for plates and shapes have reached the largest total in several years.

NOTWITHSTANDING the extremely heavy backlogs on mill books, further additions are in sight. Resumption of water shipments to the Pacific Coast, following settlement of the seamen's strike, will release considerable suspended business; the United States Navy program and rejuvenation of American shipbuilding under the auspices of the new Maritime Commission offer prospects for large steel tonnages; the agricultural equipment manufacturers are operating at what appears to be an all-time peak; road machinery builders are extremely busy; general construction work, including home building, is on the upward swing, and household equipment concerns, especially refrigerator manufacturers, are taking increasing amounts of steel. Tin plate production has regained its pre-flood average of 95 per cent. Settlement of the General Motors strike, with its consequent rush for steel, would place a still heavier burden on steel mills to satisfy customers' requirements. This settlement may have been brought a step nearer by the court injunction against sit-down strikers.

The warning by John L. Lewis of a steel strike, if demands to be formulated about April 1 by a convention of the Steel Workers' Organizing Committee are not met, carries forebodings of intense pressure upon the mills by consumers who will want to prepare against shortage of steel. Coming on top of the dislocation caused by the automobile

strike, this threat to the present high speed of the recovery movement is not taken lightly by those who have seen the breakdown of official authority in the law-breaking tactics of the sit-down automobile strikers.

Although some blast furnaces in flood areas were banked for several days as a precaution against high water, total pig iron output in January exceeded that of December by a fairly sub-

stantial margin. The estimated total for last month is 3,212,135 gross tons against 3,115,037 tons in December. The daily rate last month was 103,617 tons, a gain of 3.1 per cent over the 100,485 tons of December. There were 170 furnaces in blast on Feb. 1, unchanged from Jan. 1.

Heavy melting steel scrap has risen at Chicago, increasing THE IRON AGE composite to \$18.92, a new high.



...PITTSBURGH...

... Pittsburgh ingot output snaps back to 82 per cent, Wheeling up to 95.

o o o

... Heavy January bookings forcing mills at practical capacity despite motor strike.

o o o

... Tin plate rollings rise to 95 per cent; higher price on wire products intimated.

PITTSBURGH, Feb. 2. — Snapping back to pre-flood levels, ingot output in the Pittsburgh district is up 2 points to 82 per cent of capacity. The Wheeling district has staged a phenomenal comeback and is up 49 points to 95 per cent of capacity, one point higher than the week before flood conditions closed down some mills. Ingot operations in the Pittsburgh district are now close to practical capacity.

Exemplifying the need for new primary steel capacity are announcements by Jones & Laughlin Steel Corp. and Apollo Steel Co., the former to build a new open-hearth furnace at its Aliquippa plant, while the latter plans to construct three 60-ton open hearths at Apollo, Pa. It is certain that additional news of this character will be disclosed during 1937.

Production of finished products has been going at a breakneck pace, but little change in total backlogs has been made owing to the exceptionally good volume of bookings placed in January. Unfilled plate and shape orders have reached the largest total in several years, while sheet bookings are so heavy that most mills are booked solid for the first quarter. Some producers

have been forced to turn down orders and pressure for delivery has become a daily occurrence. Hot-rolled and cold-finished bar specifications have been lighter in the past two weeks but pipe, wire and sheet bookings are showing no recession.

Oil-country and standard pipe specifications have been steadily increasing and show the best volume for some time. Part of this improvement may be due to an anticipation of higher prices in the second quarter.

When wire prices were announced last December, it was intimated that a price advance might come without notice and, in view of the heavy domestic and foreign demand, it would not be surprising to see higher quotations for certain wire items within the next month or so.

Tin plate operations have rebounded 10 points to 95 per cent of capacity following flood shutdowns and orders are in good volume.

Heavy materials have benefitted from the placing of 2900 tons of plates and shapes for the construction of 25 coal barges and approximately 3000 tons of steel sheet

piling for two projects in New York.

Some automobile suspensions have been withdrawn, but most of the material had been fabricated awaiting releases.

Settlement of the maritime strike will start a heavy flow of finished products to Pacific Coast ports, where stocks are practically nonexistent.

A fair proportion of railroad car orders placed in the past week will be fabricated in and around this district.

Pig Iron

Tonnages placed before the price advance last November have for the most part been shipped. Producers are now working off orders taken at the higher figures. Although most consumers have committed themselves for first quarter requirements, moderate sized fill-in orders are being received. With practically all integrated mills having withdrawn from the merchant pig iron market, and with little chance that they will re-enter it so long as steel operations maintain their recent pace, merchant furnaces now in blast will undoubtedly record the best volume of business since pre-depression days. There is even a chance that some steel makers will be forced to buy steel-making iron from outside sources owing to heavy ingot output and the necessity for taking off blast furnaces for repairs.

Semi-Finished Steel

No let-up in semi-finished demand has taken place in the past week and the scarcity of this product makes present conditions definitely a sellers' market. Not only are the majority of integrated mills unable to satisfy the current customer demand, but they are hard put in keeping up with their own rolling mill requirements. With the unusual backlog of finished steel products, there is little likelihood of this situation changing in this quarter. A settlement of the automobile labor situation will increase the demand emanating from non-integrated mills furnishing material to those parts makers and plants affected by the partial shutdown.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Feb. 2, 1937	Jan. 26, 1937	Jan. 4, 1937	Feb. 4, 1936
Rails, heavy, at mill.....	\$39.00	\$39.00	\$39.00	\$36.37 1/2
Light rails, Pittsburgh.....	38.00	38.00	38.00	35.00
Rerolling billets, Pittsburgh.	34.00	34.00	34.00	29.00
Sheet bars, Pittsburgh.....	34.00	34.00	34.00	30.00
Slabs, Pittsburgh.....	34.00	34.00	34.00	29.00
Forging billets, Pittsburgh..	40.00	40.00	40.00	35.00
Wire rods, Nos. 4 and 5, P'gh	43.00	43.00	43.00	40.00
Skelp, grvd. steel, P'gh, lb...	1.80	1.80	1.80	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	2.20	2.20	2.20	1.85
Bars, Chicago.....	2.25	2.25	2.25	1.90
Bars, Cleveland.....	2.25	2.25	2.25	1.90
Bars, New York.....	2.55	2.55	2.55	2.20
Plates, Pittsburgh.....	2.05	2.05	2.05	1.80
Plates, Chicago.....	2.10	2.10	2.10	1.85
Plates, New York.....	2.33	2.33	2.34	2.09
Structural shapes, Pittsburgh	2.05	2.05	2.05	1.80
Structural shapes, Chicago..	2.10	2.10	2.10	1.85
Structural shapes, New York	2.305	2.305	2.31 1/4	2.06 1/4
Cold-finished bars, Pittsburgh	2.55	2.55	2.55	2.10
Hot-rolled strips, Pittsburgh.	2.15	2.15	2.15	1.85
Cold-rolled strips, Pittsburgh	2.85	2.85	2.85	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.80	2.80	2.80	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	2.90	2.90	2.90	2.50
Sheets, galv., No. 24, P'gh..	3.40	3.40	3.40	3.10
Sheets, galv., No. 24, Gary..	3.50	3.50	3.50	3.20
Hot-rolled sheets, No. 10, Pittsburgh.....	2.15	2.15	2.15	1.85
Hot-rolled sheets, No. 10, Gary.....	2.25	2.25	2.25	1.95
Cold-rolled sheets, No. 20, Pittsburgh.....	3.25	3.25	3.25	2.95
Cold-rolled sheets, No. 20, Gary.....	3.35	3.35	3.35	3.05
Wire nails, Pittsburgh.....	2.25	2.25	2.25	2.40
Wire nails, Chicago dist. mill	2.30	2.30	2.30	2.45
Plain wire, Pittsburgh.....	2.60	2.60	2.60	2.30
Plain wire, Chicago dist. mill	2.65	2.65	2.65	2.35
Barbed wire, galv., P'gh....	2.75	2.75	2.75	2.80
Barbed wire, galv., Chicago dist. mill.....	2.80	2.80	2.80	2.85
Tin plate, 100-lb. box, P'gh*	\$4.85	\$4.85	\$4.85	\$5.25

*Practically the equivalent of previous quotations, owing to new method of quoting effective Jan. 1, 1937.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	Feb. 2, 1937	Jan. 26, 1937	Jan. 4, 1937	Feb. 4, 1936
No. 2 fdy., Philadelphia.....	\$22.76	\$22.76	\$22.76	\$21.3132
No. 2, Valley furnace.....	21.00	21.00	21.00	19.50
No. 2, Southern Clin'ti.....	20.69	20.69	20.69	20.2007
No. 2, Birmingham†.....	17.38	17.38	17.38	15.50
No. 2, foundry, Chicago*....	21.00	21.00	21.00	19.50
Basic, del'd eastern Pa.....	22.26	22.26	22.26	20.8132
Basic, Valley furnace.....	20.50	20.50	20.50	19.00
Malleable, Chicago*.....	21.00	21.00	21.00	19.50
Malleable, Valley.....	21.00	21.00	21.00	19.50
L. S. charcoal, Chicago.....	26.54	26.54	26.54	25.2528
Ferromanganese, seab'd, car-lots.....	80.00	80.00	80.00	75.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	Feb. 2, 1937	Jan. 26, 1937	Jan. 4, 1937	Feb. 4, 1936
Heavy melting steel, P'gh....	\$19.25	\$19.25	\$19.25	\$14.50
Heavy melting steel, Phila...	18.50	18.50	16.75	12.75
Heavy melting steel, Ch'go...	19.00	18.75	17.75	13.75
Carwheels, Chicago.....	18.50	18.50	18.00	13.00
Carwheels, Philadelphia....	18.50	18.50	17.25	14.75
No. 1 cast, Pittsburgh.....	17.75	17.75	17.25	14.25
No. 1 cast, Philadelphia.....	19.25	19.25	17.25	13.00
No 1 cast, Ch'go (net ton)..	16.00	16.00	15.50	12.00
No. 1 RR. wrot., Phila.....	17.25	17.25	15.75	13.25
No. 1 RR. wrot., Ch'go (net)	16.75	16.75	16.50	12.00

Coke, Connellsville

Per Net Ton at Oven:	Feb. 2, 1937	Jan. 26, 1937	Jan. 4, 1937	Feb. 4, 1936
Furnace coke, prompt.....	\$4.00	\$4.00	\$4.00	\$3.65
Foundry coke, prompt.....	4.50	4.50	4.50	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn....	13.00	13.00	12.00	9.25
Lake copper, New York.....	13.12 1/2	13.12 1/2	12.12 1/2	9.37 1/2
Tin (Straits), New York....	50.50	50.37 1/2	51.35	48.00
Zinc, East St. Louis.....	6.00	6.00	5.45	4.85
Zinc, New York.....	6.35	6.35	5.82 1/2	5.22 1/2
Lead, St. Louis.....	5.85	5.85	5.85	4.35
Lead, New York.....	6.00	6.00	6.00	4.50
Antimony (Asiatic), N. Y...	14.25	14.25	13.75	12.87 1/2

The Iron Age Composite Prices

Finished Steel

Feb. 2, 1937
One week ago
One month ago
One year ago

2.330c. a Lb.
2.330c.
2.330c.
2.109c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

HIGH LOW

1937.....	2.330c., Dec. 28;	2.084c., Mar. 10
1936.....	2.130c., Oct. 1;	2.124c., Jan. 8
1935.....	2.199c., April 24;	2.008c., Jan. 2
1934.....	2.015c., Oct. 3;	1.867c., April 18
1933.....	1.977c., Oct. 4;	1.926c., Feb. 2
1932.....	2.037c., Jan. 13;	1.945c., Dec. 29
1931.....	2.273c., Jan. 7;	2.018c., Dec. 9
1930.....	2.317c., April 2;	2.273c., Oct. 29
1929.....	2.286c., Dec. 11;	2.217c., July 17
1928.....	2.402c., Jan. 4;	2.212c., Nov. 1
1927.....		

Pig Iron

\$20.25 a Gross Ton
20.25
20.25
18.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

HIGH LOW

\$19.73, Nov. 24;	\$18.73, Aug. 11
18.84, Nov. 5;	17.83, May 14
17.90, May 1;	16.90, Jan. 27
16.90, Dec. 5;	13.56, Jan. 3
14.81, Jan. 5;	13.56, Dec. 6
15.90, Jan. 6;	14.79, Dec. 15
18.21, Jan. 7;	15.90, Dec. 16
18.71, May 14;	18.21, Dec. 17
18.59, Nov. 27;	17.04, July 24
19.71, Jan. 4;	17.54, Nov. 1

Steel Scrap

\$18.92 a Gross Ton
18.83
17.92
13.67

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

HIGH LOW

\$18.83, Jan. 26;	\$17.92, Jan. 4
17.75, Dec. 21;	12.67, June 9
13.42, Dec. 10;	10.33, April 23
13.00, Mar. 13;	9.50, Sept. 25
12.25, Aug. 8;	6.75, Jan. 3
8.50, Jan. 12;	6.43, July 5
11.33, Jan. 6;	8.50, Dec. 29
15.00, Feb. 18;	11.25, Dec. 9
17.53, Jan. 29;	14.08, Dec. 3
16.50, Dec. 31;	13.08, July 2
15.25, Jan. 11;	13.08, Nov. 22

Bolts, Nuts and Rivets

Aggregate business has eased off a little in the past week. Some automobile suspensions have been removed, but the majority of this material was already fabricated and awaiting releases. The outlook for the next month, at least, is particularly bright in view of the exceptionally heavy demand coming from railroad car builders. Specifications from miscellaneous sources are in good volume and flood rehabilitation and renovation projects will be making themselves felt within a short time.

Bars

Total bookings have eased off further this week, but there is little evidence of a drastic falling off in new business. While backlogs have been pared down a little, deliveries are still no better than three or four weeks, and in some cases production schedules are handicapped by lack of raw steel. Moderate-sized orders are coming from jobbers, machine tool manufacturers and farm implement makers. Pressure for delivery from the latter source is especially noticeable. Railroad car and locomotive orders have made up to some extent for the lack of alloy bar specifications due to automobile suspensions.

Cold-Finished Bars

Bookings are on a par with a week ago. No heavy inroads have been made into backlogs, which still average around six weeks. Some automobile suspensions have been lifted, while heavy releases are being received from those companies not affected by the labor tie-up. Fill-in orders from jobbers and farm implement makers have been received in the past week and pressure for delivery from most sources is being exerted daily. Some cold-finishing mills are experiencing difficulty in getting hot bar stock.

Reinforcing Bars

Much interest is being centered on the Albemarle bridge project in North Carolina, which will take 1400 tons of reinforcing steel. An award is expected soon. J. F. Shea, Los Angeles, is the general contractor for the Monte Bello Tunnel, Baltimore, involving 600 tons of reinforcing steel. While large projects are small in number, there is a moderate-sized volume of jobs requiring less than 100 tons. Owing to the heavy backlogs at the mills for hot-rolled bars, and the possibility of an early settlement in the automotive tie-up, jobbers are attempting to build up their depleted stocks before deliveries become more extended than they are now.

Steel Sheet Piling

Jones & Laughlin Steel Corp. has

been awarded the contract for 1400 tons of piling to be used in the construction of a boat basin at Flushing Bay, N. Y. It will also furnish 400 of the 800 tons of piling required for jetties at Casey's Pass, Venice, Fla.; the remainder of the order went to Bethlehem Steel Co. Awards have been made on the tide gate and dam contract No. 4 for Flushing, N. Y., involving 1600 tons, which was evenly divided between Carnegie-Illinois Steel Corp. and Bethlehem Steel Co.

Plates and Shapes

In the past week backlogs of structural plates and shapes reached a level unsurpassed for several years. While inquiries and awards were light in the past week, this was to be expected considering the heavy commitments made in the last two months. Wheeling Steel Corp. has awarded a contract for 25 steel barges to the Dravo Contracting Co., Pittsburgh, which will require 2900 tons of plates and shapes.

Railroad Equipment

The Clinchfield Railway Co. car order includes 250 box cars which will be manufactured by the Greenville Car Co. at Greenville, Pa., while 600 hopper and 250 gondola cars awarded to American Car & Foundry Co. will be fabricated at the Huntington, W. Va., plant. Of the 3000 cars recently ordered by Louisville & Nashville Railroad Co., 400 hopper cars awarded to Pressed Steel Car Co. will be fabricated at McKees Rocks, Pa., while it is expected that the 500 hopper cars which went to Bethlehem Steel Co. will be made at the Johnstown, Pa., works.

Tin Plate

Tin plate operations have rebounded 10 points this week to 95 per cent of capacity, following resumption at most of the plants which curtailed operations owing to flood conditions. Damage to tin plate was negligible, owing to the prompt action of the companies in removing stocks to higher levels or obtaining releases from customers. Aggregate bookings show no change from recent levels and general line can and packers' specifications are being received in good volume.

Sheets

Sheet bookings in the past week are slightly better than in the previous period, with a well diversified demand. The situation is rapidly reaching a point where most sheet producers are booked solid for the rest of the quarter and are forced in some cases to turn down orders. Railroad car, automotive, and farm

implement requirements are taxing producers to the utmost and pressure for delivery has become the general rule. Specifications so far this year have been equal to or better than shipments with the result that, in the aggregate, little change in backlogs has occurred.

Strip

Orders are slightly better this week and backlogs have shown little change. Moderate-sized tonnages have been placed by builders' hardware interests and other miscellaneous sources. Releases from automobile companies other than General Motors have been a little heavier in the past week. So far, automotive suspensions have had practically no effect on operations in this district.

Tubular Products

Tubular goods demand is exhibiting a remarkably steady activity. Not only is the current business in good volume, but there is every indication that this trend will continue for the next month or two at least. The improvement in standard pipe bookings is due to increased home building activity made possible by unseasonably mild weather. Jobbers have been specifying freely as their stocks are none too plentiful. The steady rate of oil-country specifications has shown no signs of abatement and in most cases January business showed a moderate improvement compared with December. Some companies had the best volume of business in January in several years. Larger drilling programs, better oil consumption and mild winter weather have contributed their share to the current picture. It is felt by some that a more than vague possibility of an increase in pipe prices for second quarter delivery, coupled with the fear on the part of some customers that labor disturbances may occur in the steel industry, have contributed to the increase in the total volume of pipe business.

Wire Products

Orders for manufacturers' wire and merchant wire items are flowing in freely. There is a tendency for the total volume to increase, and part of this improvement may be due to anticipation of higher prices. When new quotations were announced last December they were not specifically applicable to the first quarter and customers were reminded that an advance without notice could materialize. With the present situation distinctly a sellers' market and both foreign and domestic demand in good volume, it would not be surprising to see an advance in certain items in the near future.

Coal and Coke

Movement of coal and coke was somewhat curtailed last week due to high water, but shipments are now practically back to normal. Center of interest is the probable outcome of meetings scheduled to begin Feb. 15 between coal operators and union officials. The union is after a 30-hr. week, with no change in weekly pay, while operators are submitting proposals for a 40-hr. week. Unfounded rumors were widely circulated last week that steel companies owning "captive" mines were refusing to deduct a special assessment made on miners by John L. Lewis, head of the United Mine Workers' Union and also driving power behind the Committee on Industrial Organization, which is attempting to unionize the steel industry. Steel companies are making these deductions in accordance with the contracts between them and the union. The opening of more than 700 beehive ovens in the Connells-ville district, mentioned last week, is additional evidence of the tight furnace coke situation.



....**ST. LOUIS**....

... **Large railroad equipment orders placed**

... **Two roads buy upward of 3000 cars**

ST. LOUIS, Feb. 2. — Railroad equipment business held the center of the stage here last week. On the same day that the Missouri Pacific Railway was authorized by the Federal Court to expend \$6,387,500 for new equipment, it placed most of it as follows: 1000 box cars, Mount Vernon Car Mfg. Co.; 500 hopper cars, American Car & Foundry Co.; 700 gondolas, Pressed Steel Car Co., and 25 cabooses, Magor Car Co. Still to be placed are six diesel locomotives, and the company will build 300 flat cars.

Missouri Kansas & Texas Railway will build 1000 freight cars in its shops at Denison, Tex., the steel for which has not been placed, and has ordered 29 passenger cars and 250 automobile cars from the American Car & Foundry Co.

The demand for finished iron and steel continues on an even keel. Structural fabricators booked heavy tonnages on identified projects before the expiration of the Jan. 30 price protection.



....**CHICAGO**....

... **All industries except automotive operating at new post-depression peak.**

... **Steel ingot rate at 78½ per cent as heavy demand continues.**

... **Flood damage expected to bring large volume of orders for rehabilitation.**

CHICAGO, Feb. 2.—A few automobile parts makers are the only exceptions among industrial plants in this area which are not enjoying a full measure of business.

Ingot production is at 78½ per cent of capacity and is straining to move to a higher level.

The agricultural implement manufacturing group is performing at what appears to be an all-time production peak and more steel may soon be used at Racine, Wis., where the Case strike is drawing to a close. The building industry is picking up, railroad car shops and car builders are busier, the road and industrial machinery of all kinds is enjoying business at a new post-depression high.

Labor unrest is not serious in this area, and the general feeling is that it will not come to the fore if the General Motors situation is properly handled by local, State and National officials.

The flood has not made heavy imprint upon the Chicago steel market, but rehabilitation work holds promise of demand from flood areas.

The scrap market continues upward and as new prices are established there remains the urge to move higher. Normal weather factors, which usually bear heavily at this time of year, are absent and in all probability their influences will not be felt during the spring scrap trading period.

Pig Iron

January shipments topped those of December by a small margin and the outlook, as now gaged by

releases, is that February will at least continue the average performance of last month. All melters report excellent business and new demands have come into the market to absorb held-up tonnages of the automobile industry. Agricultural implement manufacturers are melting iron at what appears to be an all-time high.

Reinforcing Bars

Bar fabricators' books are now growing under the stimulus of many small commercial jobs, a condition which is new to the post-depression period. Small additions to manufacturing plants, some power plants, warehouses, distributing stations and some small flat buildings all add to the swelling tide. State bridge work is moving forward, and highway slabs will soon be in stronger demand. The present situation as to tonnage is good, and the outlook for spring and summer is excellent. Prices are still jumbled, with no immediate prospect for an improved condition.

Warehouse Business

January business is running about 10 per cent ahead of the first month in 1936 and it is interesting to note that the December activity which preceded the price advance has taken little or nothing from this month. Warehouses in this area are feeling the pinch of the automobile strike but they are profiting by the Ohio River flood, which is resulting in diversion of orders to be filled from Chicago. It has been computed that the warehouse price index reached its depression low at 59.8 in February, 1933, in contrast with the pre-

depression high of 96.5 in July, 1929. In November, 1936, the index was 80.2, having remained practically stationary for over a year. From November to the end of 1936 the index rose 3.4 points to 83.6.

Wire Products

New business of all descriptions continues to flow into the market, and the approach of spring can mean, as the outlook now stands, nothing short of a still greater demand. The manufacturing trade looks exceptionally good, the only flaw being the motor strike, which has not been serious so far as Chicago mills are concerned. Jobbers are still working on tonnages taken late in 1936, but their distribution is heavy for this time of year and additional commitments for spring deliveries are in the offing. Some orders are being diverted from flooded mills, but local producers expect real benefits when rehabilitation starts. It is expected that there will not alone be the efforts of private capital, but that the Government will undertake much work and that loans will be made available so that individuals can make quick purchases for repairs.

Rails and Track Supplies

Revision is necessary of the tonnage which can be shipped from rail mills. This is necessitated because of the proportion of specially treated rails, for which railroads are now calling. In other words, it is no longer a matter of what the rolling mill will do, and this situation will prevail until additional rail treating facilities are provided. The current rate, based on what actually can be shipped, stands at about 70 per cent of capacity. Railroads are sending out feelers for stock supplies of spikes and bolts which can be shipped on short notice to the flooded Ohio and Mississippi valleys.

Sheets

Much new tonnage is being offered and it is being added to books for pricing and delivery in the second quarter. General Motors is again releasing some tonnage for use in plants which are not strike bound, the plan being to help those workmen who want to work and to build a supply of parts.

Bars

Railroad cars, though requiring a smaller proportion of bars than formerly, nevertheless are accounting for a round tonnage and therefore are aiding in taking up any slack which would otherwise result from the automobile strike. Last


week was exceptionally good from the viewpoint of bar bookings, a direct result of the closing of books at the end of January on specified projects which had been subject to fourth quarter prices. Miscellaneous demand remains high, except from some forge shops which have had orders suspended because of General Motors strike.

Plates

This market has come back into its own, especially during the last week in January, when the railroads rushed in car orders to take full advantage of fourth quarter prices. Large plate orders are seldom found but miscellaneous work is plentiful. Orders are being placed for two Mississippi River dams and another in Missouri is now out for figures.

Structural Material

With the end of winter in sight, Middle Western States are again rushing into the market for bridges. There will be further activity in that phase of the market as soon as rehabilitation work gets under way in the flooded Ohio and Mississippi valleys. A Mississippi River dam at Winfield, Mo., will take 2500 tons. Among noteworthy new lettings are 1330 tons for the Santa Fe Railroad, 1200 tons for an American Can Co. project and 700 tons for a packing plant at Des Moines, Iowa.



REINFORCING STEEL

**... Awards of 4030 tons
—4450 tons in new
projects.**

AWARDS

Manchester, N. H., 125 tons, bridge, to Truscon Steel Co.

New York, 400 tons, viaduct, to Carroll-McCreary Co.

New York, 180 tons, Coast Guard station, Floyd Bennett field, to Bethlehem Steel Co.

Union City, N. J., 100 tons, Yardley Ltd., building, to Joseph T. Ryerson & Son Co., Inc.

Philadelphia, 450 tons, school, to Sweet's Steel Co.

Philadelphia, 350 tons, school, to American Steel Engineering Co.

Washington, tonnage unstated, Apex building, to Sweet's Steel Co. Large amount of mesh yet to be awarded.

Indianapolis, 180 tons, railway and bus terminal, to Hugh J. Baker Co.

Chicago, 1375 tons, division Q of Sanitary District, to an unnamed bidder.

State of Indiana, 150 tons, highway work, to Concrete Steel Co.

San Francisco, 200 tons, Insurance Co. of America building, to Gunn Carle & Co.

San Francisco, 520 tons, Lyon Street approach for Golden Gate bridge, to Soule Steel Co.

NEW REINFORCING BAR PROJECTS

PENDING

Hudson, N. Y., 700 tons, Universal Atlas Cement Co.; bids taken this week.

Kearny, N. J., 1000 tons, Coca-Cola Co. building; bids Feb. 9.

Raleigh, N. C., 1450 tons, Albemarle Sound bridge and approaches; bids taken.

Philadelphia, 400 tons, school; bids taken.

Denver, 100 tons, bridge and approaches; bids opened.

Davis, Cal., 250 tons, gymnasium for College of Agriculture; bids soon.

Los Angeles, 317 tons, two girder bridges across Big Tujunga Wash; bids soon.

Fontana, Cal., 113 tons, school; bids Feb. 15.

Lindsay, Cal., 116 tons, school; bids opened.



...BUFFALO...

... Pig iron business gaining; steel output steady.

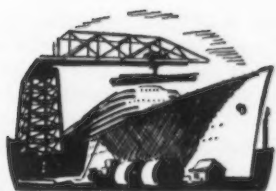
BUFFALO, Feb. 2—While most melters are covered for their pig iron requirements, producers report considerable spot business at the new prices, and this volume is picking up as inventories shrink.

Operations of Buffalo steel mills are at the same level, Bethlehem's Lackawanna plant having 25 open hearths active; Republic, seven, and Wickwire-Spencer Steel Co., two. It may be another two weeks before the fourth furnace in the newly-constructed Bethlehem's unit of six will be lighted.

Two sizable warehouses to involve considerable tonnages of fabricated structural and reinforcing bars are planned, but the amount of the tonnage is not yet available. One of these is another addition for the Trico Products Co. of Buffalo.

White Motor Co. Gets Large Truck Orders

THE White Motor Co., Cleveland, has announced the receipt of an order for 130 heavy-duty trucks, to cost \$500,000, from the Société Anonyme Centrale, the government transportation monopoly at Teheran, Iran, and also an order for 36 road-building trucks for the Mexican Government.



.. PHILADELPHIA ..

... *January sales volume above normal in some offices*

o o o

... *No lessening in rate of incoming business*

o o o

... *Operations continue at 56½ per cent of capacity*

PHILADELPHIA, Feb. 2—After a January which, in some sales offices, was above normal and in excess of the 1936 monthly average, new business shows no sign of a let-up. Operations in this district continue unchanged, being unaffected by floods or labor difficulties. Assuming the continuance of new business at present levels, additional open-hearth furnaces will probably be started up within a month.

With the closing of definite contracts for identified structures at the end of the month, steel companies now know exactly what tonnage may be expected from this source, as opposed to the confusion existing prior to the closing date, when several mills were granting coverage on identical jobs, none knowing to whom the actual work would be given. There is still disagreement among the trade, however, in regard to the limit set for the receipt of specifications on specified projects. Some mills have set the end of February as the final date, while others favor the last of March or even later.

The upward surge in the price of scrap was checked this week, as the market quieted and last week's \$18.50 quotation in No. 1 steel was reaffirmed.

Pig Iron

Sales were very light this week, although shipments were quite heavy, and seemed to have increased some over the last two weeks. More specifications against contracts are being received at the moment than is usual, according to some sellers. Little, if any, iron is being stocked at furnaces, as that not being shipped against contracts is usually demanded by spot buyers. A resumption of buying is not expected before the middle of March.

Sheets and Plates

New orders for sheets are being placed upon the books, even though delivery cannot be made before next quarter by many mills. Jobbers' stocks are requiring large amounts of sheets at present, in addition to a healthy general demand. Deliveries have been extended about one week by district mills on sheets and plates. The chief demand for plates at the moment from mills here seems to be from outside this district. With the announcement of a probable settlement this week of the Pacific Coast seamen's strike, plate mills are rolling old orders that have been suspended since the strike began. A substantial tonnage will soon be shipped to the West Coast, much of it for pipe lines.

France, England, Japan and the Scandinavian countries are reported to be in the market here for plates.

Shapes and Reinforcing Bars

The largest award of the week, 4500 tons of structural shapes, went to the Bethlehem Steel Co. for a new plant of the Viscose Co., Front Royal, Va. Belmont Iron Works also figured in this project, receiving 1025 tons of shapes for a power house at the same site. Bethlehem also was awarded 900 tons of shapes for a bakery addition in Philadelphia, while the Lehigh Structural Steel Co. was given 600 tons of shapes for a printing plant in Hoboken, the Alco Gravure Co. Lehigh also took 700 tons of the structural steel reported last week for the Pennsylvania Railroad's electrification program. It is understood that the Fort Pitt Bridge Works Co. and the Shoemaker Bridge Co. also obtained some of this tonnage, in addition to Bethlehem and American Bridge

Co., which were mentioned in this connection last week. McCloskey & Co. awarded 800 tons of bars in the two Philadelphia schools which have been pending for some weeks to Sweet's Steel Co., 450 tons, and American Steel Engineering Co., 350 tons. Bids were taken Tuesday on an additional 400 tons for another school. New projects are light, totaling only a few hundred tons in road work.

Imports

The following iron and steel imports were received here last week: 1000 tons of ferromanganese from Norway; 22 tons of steel bars, 33 tons of steel bands and 83 tons of structural shapes from France; 29 tons of steel bars, 2 tons of steel bands and 243 tons of structural shapes from Belgium.



.. SAN FRANCISCO ..

... *Settlement of seamen's strike assured.*

o o o

... *Will bring heavy water shipments from East.*

o o o

... *Large construction projects coming to life.*

SAN FRANCISCO, Feb. 1.—With all major points of controversy satisfactorily settled, the Pacific Coast maritime strike is virtually at an end. Strikers are expected to return to work either this week or early next week. All points left unsettled at the end of two weeks will be subjected to arbitration, according to authoritative reports. It is expected, however, that confusion and delay resulting from three months' inactivity will maintain for at least another month.

Steel companies are preparing to the best of their ability to meet the heavy demand for all types of steel which will undoubtedly follow the announcement of peace. Stocks here are very low and water shipments from Eastern ports will be heavy. Though some steel remains aboard ships docked on the Coast three months ago, nearly all of this is already under contract. Thus it will be several weeks be-

fore full efficiency can again be reached. In the meantime, Pacific Coast steel mills will operate at capacity to relieve the expected strain as much as possible.

New bids will probably be called some time this month on a Pearl Harbor, T. H., floating drydock involving some 40,000 tons of steel.

President Roosevelt has recommended a \$1,000,000 increase in the \$6,500,000 allowance for a combination post office and jail in Los Angeles. It has not been determined whether an award of contract will be made on bids submitted last October, at which time George A. Fuller Co., Washington, D. C., was low bidder of two on the general contract. The project calls for 20,000 tons of shapes and 5000 tons of bars.

Bids will be called for within two weeks by the Board of Terminal Managers in Los Angeles for the construction of a union passenger station. Approximate cost will be \$2,500,000.

Awards in the past week were light and few new projects were announced. Business, however, is expected to increase rapidly during the next month.



... Shortage of molders in New England foundries

... Warehouses adopt extras for small-lot orders

BOSTON, Feb. 2.—Pig iron buying in the past week was confined to a few scattered lots, largely for mixture purposes. Foundries generally are busier than at any time in 1936, with many consuming pig iron more freely than anticipated. Many are "stealing" molders from each other, so short is the supply. Molders have been granted an increase in wages to 90c. per hr., and on March 1 will receive \$1, an all-time high record.

New England industrially is very busy. The Pittsfield, Mass., General Electric Co. unit last week shipped 35 carloads of apparatus into flood lands, the largest unit shipment ever made from the plant.

The Westinghouse Electric & Mfg. Co.'s West Springfield, Mass., plant is employing 5700, an all-time peak; about 5100 are in manufacturing divisions.

In view of higher costs for handling small orders, local warehouses have adopted the following quantity extras on orders for hot-rolled products: Total under 100 lb., \$1.50 extra per 100 lb.; 100 to 399 lb., 50c. extra. No change has been made in extras for larger quantities or for broken bundles.



... Pullman-Standard gets large car orders

... Steel and pig iron output at high rate

BIRMINGHAM, Feb. 2. — Two railroad car orders were released last week to the Bessemer, Ala., plant of the Pullman-Standard Car Mfg. Co. The Nashville, Chattanooga & St. Louis Railroad ordered 500 all-steel freight cars and the Louisville & Nashville Railroad 900 hopper cars. The Louisville & Nashville Railroad also recalled 400 men to its Boyles shops, in Birmingham, after a week's lay-off, to repair and rebuild box cars and locomotives.

The Pullman-Standard plant at Bessemer is now completing an order of 100 box cars for the Birmingham Southern Railroad and also has on hand orders for 25 gondolas from the same railroad, 250 box cars for the Southern Pacific and 1000 box cars for the Seaboard Air Line.

Chicago Bridge & Iron Co. has received an order from the Pan American Petroleum Corp. for eight 80,000-gal. tanks, a number of smaller tanks and other steel work for the Texas City, Texas, refinery.

Ingalls Iron Works has booked 540 tons for the Marshall Stove Co., Lewisburg, Tenn. Virginia Bridge Co. is expecting to receive an order for 965 tons for the Atchafalaya River Bridge, Simmsport, La. Southern Steel Works is furnishing 125 tons to the Charity Hospital, New Orleans.

Production of pig iron and steel is holding steady. Fifteen blast furnaces are operating. Open

hearthings vary from 17 to 18. Last week 18 were worked; this week there will be 17. Pig iron buying is light at this time, but new steel tonnage is substantial. A heavy outward movement of iron and steel continues.



... Business continues to improve

... Higher prices announced on some steel products

TORONTO, Feb. 2. — General business continues to show improvement in the Canadian iron and steel markets. Producers have advanced prices on some semi-finished and finished products. Steel sheets are in strong demand and producers are not accepting orders at current prices for delivery past the end of March. Bars and reinforcing steel also are showing improvement and there is an expanding demand for structural steel. Dominion Bridge Co., Montreal, has been awarded contract for 3000 tons of steel for the bridge across Riviere des Prairies, near Montreal, to be four-span, for the provincial government. Substantial orders have been closed for rolling stock for the Canadian National and Canadian Pacific railroads, which assure equipment producers sufficient work to keep plants operating at capacity for several months. Other substantial business is pending, including good orders from the mining and automotive industries.

Demand for merchant pig iron is increasing steadily, with some 1500 tons booked during the past week, most of which was for immediate delivery. Producers report sales up to 500 tons, with demand largely for foundry iron, but good turnover also reported in malleable and odd lot sales in basic. Pig iron production is holding at a high level. Imports are small. Prices are firm at the new levels announced last week.

Trading in iron and steel scrap continues active, and dealers in the Toronto and Montreal areas state that there is an active market for all the material they can pick up. Shipments out of yards exceed new supplies taken in, with the result that stocks have been steadily declining for some time.



... CLEVELAND ...

... Youngstown operations stepped up as flood danger disappears.

o o o

... Releases coming from General Motors plants that have resumed work.

o o o

... Some mills booking sheet business for April as heavy demand continues.

CLEVELAND, Feb. 2.—Ingot output in the Youngstown district, which was slightly reduced last week because of high water, was stepped up to 78 per cent of capacity this week, a gain of two points. In the Cleveland-Lorain district the output is unchanged at 79 per cent of capacity. High water still is retarding resumption of steel plants in the Cincinnati district and southern Ohio coke ovens.

Business with the automotive industry has taken a turn for the better due to releases that have come in the last day or two from some of the General Motors plants. These releases, mostly for sheets and strip, have been issued for shipment of material to plants that have partially resumed operations. Some suppliers of parts for General Motors cars also have been given releases. The Ford and Chevrolet plants are taking heavy shipments of steel and several sheet mills that do not share in General Motors business are not feeling the effects of the strike.

New demand for finished steel is quite satisfactory, considering the heavy forward buying in December. There is still pressure for delivery of sheets, which, although somewhat better than a few weeks ago, is still far advanced. Consumers continue to place orders on the mill books to assure deliveries when wanted. Some of the sheet mills are entering orders to be shipped in April at the price prevailing at the time of shipment, but others that are filled up for the current quarter are refusing to take business for more extended delivery. Additional orders for a good tonnage of sheets were placed

by a leading refrigerator manufacturer the past week. Some new demand also came from customers whose regular sources of supply have been temporarily cut off by mill shutdowns caused by the Ohio River flood. Stocks of some sheet jobbers in the flooded area were badly damaged by the water. New business is coming from some bar consumers who did not buy heavily before the price advance and who must replenish their stocks.

Shipments of considerable finished steel held up by the Pacific maritime strike have been released, the steamship companies having advised the steel plants Saturday that they would accept shipments for the Pacific Coast now that the end of the strike appears at hand. Some of this steel has been held at Eastern docks and some at Ohio mills. Bolt and nut makers also had large Pacific Coast shipments held up and these are now released.

Pig Iron

New demand is light and confined mostly to small lots. Most consumers still have good stocks and producers look for little activity until March 1, when books are opened for the second quarter. The melt is holding up well and the amount of iron shipped in January, although curtailed by suspensions from the General Motors strike, was only slightly lower than in December.

Coke

Shipments of foundry coke from Ohio River plants are still shut off because of the flood and it probably will be several days before production can be resumed at Ashland and Ironton. Railroad

embargoes are in effect at those points. Some coke is being shipped from Buffalo to consumers in this territory whose supply has been cut off.

Sheets

New demand for sheets has been stimulated by the Ohio River flood, which submerged and badly damaged stocks of some jobbers and fabricators and stopped production by mills located in the affected area. Consumers who had been depending on mills whose operations were interrupted are attempting to place orders elsewhere. With the partial resumption of operations by a few General Motors plants, some releases have been issued for shipments that were suspended at the start of the strike. Light hot rolled and galvanized sheets are in heavy demand from diversified industries. Deliveries of cold rolled sheets have improved considerably because of the General Motors suspensions. Pressure for deliveries for other grades continues heavy. One producer cannot take orders for delivery of certain sizes before May.

Strip Steel

Shipments are heavy to automobile plants other than General Motors units and some of the mills have withdrawn from the market because their order books are filled for the quarter. There is considerable pressure for deliveries and a fairly active new demand for hot strip from miscellaneous consumers who want early shipments.

Iron Ore

Receipts of Lake Superior ore at lower Lake ports in 1936 amounted to 44,337,951 tons, compared with 23,078,724 tons during the previous year. Of the total, 31,437,884 tons was received at Lake Erie ports and 12,900,067 tons at Lake Michigan ports, Detroit and Hamilton and Sault Ste. Marie, Ont. Receipts at Lake Michigan ports were 10,781,030 tons. Shipments from Lake Erie docks during December were 589,893 tons, against 238,022 tons in December, 1935. The dock balance Jan. 1 was 4,379,653 tons, compared with 5,093,441 tons on Jan. 1, 1936.

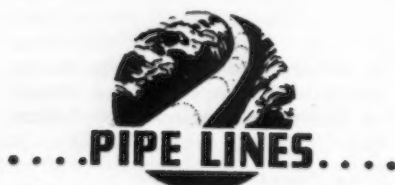
Bolts, Nuts and Rivets

Bolt and nut business is fair, although the volume fell off considerably last month as compared with December. Makers still have good backlogs. Shipments are being restricted by General Motors suspensions. Rivets are in good demand from railroads. Considerable business has been closed at the old prices for identified projects, consumers not allowing pro-

tections to lapse on Jan. 1, the expiration date. Some business is being taken at the new first quarter prices.

Bars, Plates and Shapes

Specifications for bars are good, although some suspensions are still in effect from forge shops. A fair amount of new business is being placed at the first quarter price. Mills are gaining slowly on deliveries as shipments are larger than the volume of new business. Demand is good from builders of road machinery and power shovels. There is a fair volume of business in structural shapes, but new projects are not numerous. The Lima Locomotive Co. has placed 354 tons with the R. C. McMahon Co. for plant extensions, and the Ohio State Highway Department has asked for bids for grade crossing eliminations in Akron, requiring 700 tons.



Michigan Gas Transportation Corp., United Artists' Building, Detroit, Northern Indiana Power Co., and Public Service Co. of Indiana, both Traction Terminal Building, Indianapolis, plan joint construction of welded steel pipe lines for natural gas transmission to group of communities in Indiana. Main welded steel trunk line will connect with present terminus of pipe line system of first noted company north of Indianapolis, with branch lines leading to Crawfordsville, Lafayette, West Lafayette, Noblesville, Frankfort, Tipton, Mechanicsburg and vicinity, where steel pipe distribution systems will be built and operated by last two noted utilities. Project will include booster stations and control plants at municipal limits. Cost over \$1,000,000. Work will begin early in spring.

Board of District Commissioners, District Building, Washington, asks bids until Feb. 30 for 7120 ft. of 31½-in. outside diameter, steel pipe and specials, including sleeve-type couplings.

Panhandle Eastern Pipe Line Co., 101 West Eleventh Street, Kansas City, Mo., plans welded steel pipe line from present terminus in Indiana to northwestern Ohio district for natural gas transmission to Bryan, Defiance, Napoleon and other points, where control stations and steel pipe distributing systems will be constructed.

Pure Transportation Co., Mount Pleasant, Mich., plans steel pipe line gathering system in new oil field of Buckeye Township, Gladwin County, with main welded steel pipe line for connection with present pipe line system for crude oil transmission.

Big Chief Oil Co., Oklahoma City, Okla., plans about 10,500 ft. of 8-in. welded steel pipe in McMechan Parkway district for oil transmission. E. D. Hill, Insurance Building, is engineer.

Phillips Petroleum Co., Bartlesville, Okla., plans 3-in. welded steel pipe line from Oklahoma City to Edmond, Okla., about 11 miles, for gasoline transmission. Cost over \$80,000.

Board of Awards, Baltimore, has let contract to J. F. Shea Co., Inc., 617 South Olive Street, Los Angeles, for 12-ft. Gunpowder Falls-Montebello water tunnel, totaling 34,600 ft. between these

two points, at \$5,389,312, to include 2100 ft. of 10-ft. diameter steel pipe in 13-ft. open cut from Cromwell Bridge road to dam, and about 11,000 ft. of steel pipe lining; also 8 to 48-in. steel pipe at different points, 44,000 lb. steel castings and 155,000 lb. iron castings. About 36 months will be required to complete project. C. J. Kavanagh, Lord Baltimore Hotel, Baltimore, will be superintendent of construction.

Alhambra, Cal., has awarded 111 tons of 16-in. steel pipe to American Pipe & Steel Corp.

Phillips Petroleum Co., Bartlesville, Okla., has let contract to J. F. Pritchard & Co., for steel pipe gas gathering lines in Eunice, N. M., field. Forty-five miles of new system will be Lindewelded.



... Mills affected by shortage of pig iron and steel.

... Domestic requirements are still increasing.

LONDON, Feb. 2 (By Cable)— Pig iron output remains inadequate. Home consumers have been rationed and exports have been limited. Moreover, makers are reluctant to accept further business for any delivery owing to their heavy commitments and to the ore and scrap shortage. Home steel requirements are still increasing and a record production is being raised further. United Steel Companies are spending £3,500,000 to double the capacity of the Appleby Works, Scunthorpe.

British makers of semi-finished steel are overwhelmed with orders and the Continent is reluctant to sell additional quantities to Britain owing to the shortage there and to the fact that better prices are obtainable in other markets. All heavy steel products, especially structural material, are heavily specified. Sheet makers' production is affected by the steel shortage. Only a small proportion of the large export demand for miscellaneous steel products can be accepted.

Tin plate output has been curtailed by the steel shortage and while the demand is brisk business is being refused. Prices are firm and a 6d. premium is being obtained over official quotations.

Continental iron and steel works are fully sold up to the end of April and are unable to accept business before then and are refusing orders beyond then owing to price uncertainty and a shortage

of raw materials. Rerollers' operations have been curtailed by the shortage of semi-finished steel.

British prices are unchanged. The International Hoop Cartel has raised the price 5s. to 7s. 6d. Other Continental gold prices are nominally unchanged.



... Many foundries flooded; some mills still idle

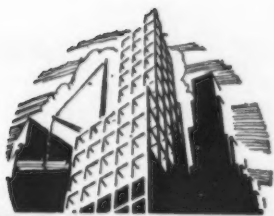
... Middletown operation is better at 70 per cent

CINCINNATI, Feb. 2.— Flood difficulties eased the past week as the swollen Ohio receded to about 10 ft. above flood stage.

Sheet steel ordering, as reported by the leading district interest, is brisk and near to capacity output. Operations at the Middletown unit of American Rolling Mill Co. are about 70 per cent, with the strip mill still undergoing repairs. The Zanesville unit is in full operation, but the Ashland unit will not be in operation until the latter part of this week. Portsmouth and Newport mills are still out of operation because of flood waters. High water prevents survey of the Newport plants and no forecast of reopening is possible. Units that are in operation report pressure necessary to get sufficient railroad cars for shipments.

New purchases of pig iron are nil. The Hamilton Coke & Iron Co., unaffected by the flood, continued in full operation, although Cincinnati representatives of outside furnace interests were unable for the greater part of the week to get to their offices. Shipments to all but metropolitan Cincinnati and northern Kentucky melters were well maintained. The exceptions were due to flooding of foundries. The melt is low because of flood difficulties and is estimated at about 25 per cent and confined to melters in the outlying portions of the district.

Although swirling flood waters of the Allegheny River at one time were almost a foot deep in front of the plant and offices of the Pittsburgh Piping & Equipment Co., Pittsburgh, practically no damage resulted. The company's works are located within 100 yd. of the normal river bank.



... NEW YORK ...

... Heavy ordering of steel against identified construction projects.

o o o

... Railroads also place car orders to take advantage of price protection.

o o o

... General run of business holds steady; sheet buyers still pressing mills.

NEW YORK, Feb. 2.—A heavy volume of steel orders was placed in the final days of January as final protection on identified construction projects and railroad equipment orders. The deadline for such orders was Jan. 30, by which date formal contracts were required against price protection granted in December. In addition to a sizable amount of structural steel and plates required for construction work, including a good many oil tanks, several railroads placed contracts for several thousand freight cars, against which car builders placed orders for the steel. No accurate estimate of the tonnage that was driven in during the past week is obtainable, but in all probability it amounted to a few hundred thousand tons in this district alone.

Aside from such business, the general run of miscellaneous requirements of manufacturers and jobbers has sustained steel buying. January business was considerably in excess of the expectations of steel companies. Not only have orders been greater than shipments for several producers, but the January volume was well above the 1936 monthly average, and in some instances exceeded the total for any month last year except December.

Consumers of sheets continue to place orders for shipment at the earliest possible time, which for some mills will be April. Such orders are being booked only with the understanding that they will be invoiced at the prices in effect at time of shipment. One producer

has withdrawn from the market on all hot rolled sheets, including galvanized, for first quarter and is not willing to book business at this time for second quarter.

With the settlement of the seamen's strike on the Pacific Coast, this week, a heavy volume of suspended steel tonnage will move by water as rapidly as cargo space can be obtained. Some of this steel has been in storage at the mills, but a good many orders are still to be rolled.

On April 1, bids will again be taken on a United States Lines ship to replace the Leviathan. Gibbs & Cox, naval architects, are now working on designs for two or three Panama mail boats, which will require an unofficially estimated 4000 tons of steel each. Three packet boats for an as yet undivulged operator are being designed by Theodore Ferris, bids to be taken Feb. 10. The Savannah Line has George Sharp working on plans for two boats, each to require about 3000 tons of hull steel. Bids on these will not be taken for several months. A ferry for use at Yonkers, N. Y., involving about 300 tons of plates, was awarded to United Shipbuilding & Drydock Co.

Pig Iron

A New Jersey company has inquired for 500 tons of No. 2 foundry iron for delivery through March, April and May. Some producers are not willing to quote beyond March 31, as their books for second quarter will not be opened until March 1. This is the largest in-

quiry in some weeks, as most pig iron consumers have contracted for their first quarter requirements, and the bulk of current business is in carload lots. In view of the shortage of No. 1 machinery cast scrap and the high prices being asked for this grade, many foundries are increasing the use of pig iron in their mixtures. Deliveries of ordinary foundry grade are sustained, but in some instances producers can not give prompt attention to demands for specialty irons as supplies are tight. While foreign inquiry continues to be reported in this market, the high domestic price has discouraged exportations. Business which is known to have been done has been based on less than domestic quotations. Another difficulty is that foreign users are unaccustomed to American analyses, and furnaces here have trouble in quoting on foreign requirements.

Reinforcing Steel

Awards reported this week total about 700 tons, and new pending projects about 1700 tons. A building at Kearny, N. J., for the Coca-Cola Co., requiring 1000 tons, will be bid on Feb. 9, and a Universal Atlas Cement project at Hudson, N. J., involving 700 tons will come up for bids this week. The bars for the Midtown tunnel, East River Drive and tide gate and dam at Flushing are still unawarded. Price shading is still reported. One instance in particular involved a small amount of new billet steel, which is said to have gone at 2.10c., base, instead of 2.68c.



RAILROAD BUYING

Milwaukee Road has received permission to apply to Interstate Commerce Commission for authority to finance 75 per cent of the cost of building new equipment with equipment trust certificates. Cars to be constructed in company shops include 500 50-ton hopper cars, 500 50-ton automobile cars, seven dining cars, one mail-express car and five coach-baggage cars. This road has also asked the Federal court at Chicago to approve construction in company shops of 1000 gondola cars and 22 air-dump cars.

Northern Pacific has ordered nine 4-6-6-4 type locomotives from American Locomotive Co. and 2000 freight cars.

Grand Trunk Western is inquiring for 100 70-ton gondola cars.

St. Louis-San Francisco will build 600 box cars, 250 hopper cars and 20 caboose cars in its own shops.

Illinois Terminal has ordered 100 50-ton gondola cars and 50 50-ton flat cars from Mount Vernon Car Mfg. Co.

Illinois Central has placed orders for 3100 freight cars as follows: 500 automo-

bile box cars each with Pullman-Standard Car Mfg. Co. and American Car & Foundry Co.; 800 automobile box cars and 300 refrigerator cars with General American Transportation Corp.; 500 hopper cars each with Pressed Steel Car Co. and Ryan Car Co.

St. Louis Southwestern is inquiring for 10 chair cars.

Missouri-Kansas-Texas has placed 25 chair cars, three diners, one lounge car and 250 automobile cars with American Car & Foundry Co. This railroad will build 1000 freight cars in its own shops.

Chicago & North Western has ordered 150 dump cars from Rodger Ballast Car Co.

Missouri Pacific has been authorized to expend \$6,387,500 for new equipment and has placed the following orders: 1000 box cars with Mount Vernon Car Mfg. Co.; 500 hopper cars, American Car & Foundry Co.; 700 gondola cars, Pressed Steel Car Co.; 25 cabooses, Magor Car Co. The railroad will build 300 flat cars and will buy six diesel locomotives.

Nashville, Chattanooga & St. Louis has placed 500 box cars with Pullman-Standard Car Mfg. Co.

Clinchfield has ordered 250 box cars from Greenville Car Co., 600 hopper and 250 gondola cars from American Car & Foundry Co.

Great Northern has ordered 500 50-ton gondola cars from Pressed Steel Car Co., 500 50-ton box cars from Pullman-Standard Car Mfg. Co. and 500 50-ton box cars from American Car & Foundry Co.

Louisville & Nashville has applied for authority to issue \$4,950,000 in equipment trust certificates to aid in financing purchase of 2700 all-steel hopper coal cars and 300 all-steel ballast cars at cost of approximately \$6,600,000. Ballast cars will be built by American Car & Foundry Co., and coal cars have been awarded as follows: Bethlehem Steel Co., 500; Pressed Steel Car Co., 400; Mount Vernon Car Mfg. Co., 400; Pullman-Standard Car Mfg. Co., 900; American Car & Foundry Co., 500.

American Car & Foundry Motors Co. has received the following orders for motor coaches: Five each from Houston Electric Co., Houston, Tex., and Southern Pennsylvania Bus Co., Chester, Pa.; six from Cincinnati Railway, Cincinnati, and four from Boston Elevated Railway, Boston.

Sheet & Tube Net Above \$10,500,000

YOUNGSTOWN SHEET & TUBE CO. and subsidiaries earned \$10,564,501 in 1936 after all charges, including taxes, interest, depreciation and depletion, according to its preliminary consolidated income account statement. This compares with net earnings of \$1,597,521 in 1935.

Depreciation and depletion charges in 1936 were \$6,837,763, against \$5,683,843 in 1935. Earnings during 1936 equaled \$7.03 a share on the 1,384,752 shares of common stock outstanding at Dec. 31.

U. S. Chamber of Commerce Oppose Abolition of Basing Point System

WASHINGTON, Feb. 2.—In a report of a special committee of the Chamber of Commerce of the United States, made public today, strong support is given the basing point and other systems of delivered prices. The report opposes legislative restrictions upon the freedom of sellers to quote by any method desired. It directs attack at two particular measures, the Wheeler and Patman bills, which were introduced at the last session of Congress. They would require abandonment not only of the basing point method of quoted prices but of pricing methods of many kinds which are used

daily in a variety of wholesale trades. So far the measures have not been reintroduced at the present session of Congress.

The chamber report declared that the basing point system and other systems of delivered pricing are the most practical means yet devised for preserving competition in the case of industries in which production and markets are widely separated and transportation costs constitute a large proportion of the delivered price. The basing point and other systems of delivered or partial-pricing, the report states, find their greatest justification in the advantage they give to buyers.

Wages Rise, Prices Drop Since 1923

AVERAGE hourly wages of steel employees have increased 23 per cent since 1923, during which period the composite selling price of finished steel products as reported by leading trade papers has decreased 16 per cent, according to the American Iron and Steel Institute.

During 1933 the annual average of both steel wages and prices reached the low point of the depression. In that year average hourly earnings of the industry's wage earners was 12 per cent below the average at the beginning of the period, but the composite price of steel was 30 per cent below 1923.

Average earnings of steel wage earners in 1923 amounted to 59.6c. per hr., from which level they steadily advanced until the full force of the depression began to be felt. In 1933 the average hourly wage paid was 52.4c. per hr.; in every year since then the average wage has increased until currently it exceeds 73c. per hr.—the highest in any year for which data are available.

The composite of steel prices, however, declined \$20 per ton from 1923 through 1933. The decline was interrupted only in 1929 when the composite price for the year showed a 2 per cent advance over the preceding year.

Since 1933 steel prices have risen gradually, but are still 4 per cent below the average in the seven years preceding the depression.

By comparison, the increase of approximately 20 per cent in the

composite price of steel products over a recovery period of four years is less than the percentage increase in prices of various non-ferrous metals, in unfinished form, during the past six months.

First Wage Fixing by Secretary Perkins

WASHINGTON, Feb. 2.—The first decision fixing wages under the Walsh-Healey Government Contracts Act was announced yesterday by Secretary of Labor Frances Perkins, who fixed a minimum wage of \$15 for a week of 40 hr., or 37½c. per hr. in the men's work clothing industry. In doing so she sustained both a majority and a minority opinion of the Government Contracts Board, which, she stated, differed only in reasoning and not in substance.

The wage fixed is to apply to the entire industry which was said to constitute one competitive area. The majority opinion said that in view of this fact, "The establishment of differentials would be on arbitrary and imaginary lines in this instance." It was also pointed out that none of the employer or employee representatives who were at the hearings or at the conferences on the subject recommended the establishment of different rates for particular sections of the country.

Donald Richberg, former NRA administrator, discussed proposed legislation for fixing maximum hours, minimum wages and unfair trade practices with President Roosevelt at a White House luncheon Monday, but would not say whether or not he had submitted a program to the President.



...NON-FERROUS...

... January tin deliveries 7615 tons.

... Supply shortage threatens zinc market.

NEW YORK, Feb. 2.—The unsettling effect upon foreign buyers of the flood and automobile strike in this country has lost some of its importance, and copper markets are accordingly improved. Buying so far this week has been in fair volume from both domestic and export sources, and prices governing the latter type of business were reported this morning at 12.80c. to 12.85c., c.i.f.,

against the unchanged domestic basis of 13.00c., Valley. Current rate of domestic consumption has been somewhat reduced due to the motor car strike, but other uses continue to afford a considerable outlet. Importance of utility company buying is indicated by the fact that new additions to plants of the Bell system in 1937 are expected to cost more than \$125,000,000.

The Week's Prices. Cents Per Pound for Early Delivery

	Jan. 27	Jan. 28	Jan. 29	Jan. 30	Feb. 1	Feb. 2
Electrolytic copper, Conn.*	13.00	13.00	13.00	13.00	13.00	13.00
Lake copper, N. Y.	13.12½	13.12½	13.12½	13.12½	13.12½	13.12½
Straits tin, spot, New York	50.10	50.20	49.80		49.90	50.50
Zinc, East St. Louis	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York	6.35	6.35	6.35	6.35	6.35	6.35
Lead, St. Louis	5.85	5.85	5.85	5.85	5.85	5.85
Lead, New York	6.00	6.00	6.00	6.00	6.00	6.00

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin 99 per cent plus 19.00c.-21.00c. a lb. delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 17.00c. a lb. delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 14.25c. a lb., New York.
Quicksilver, \$88.50 to \$92.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 13.75c. a lb. delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse Delivered Prices, Base per Lb.	
Tin, Straits pig	51.50c. to 52.50c.
Tin, bar	53.50c. to 54.50c.
Copper, Lake	13.75c. to 14.75c.
Copper, electrolytic	13.75c. to 14.75c.
Copper, castings	13.00c. to 14.00c.
*Copper sheets, hot-rolled	20.37½c.
*High brass sheets	18.25c.
*Seamless brass tubes	20.87½c.
*Seamless copper tubes	21.37½c.
*Brass rods	16.12½c.
Zinc, slabs	7.00c. to 8.00c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.75c.
Lead, American pig	7.00c. to 8.00c.
Lead, bar	8.00c. to 9.00c.
Lead, sheets, cut	8.75c.
Antimony, Asiatic	15.00c. to 16.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ½	31.50c. to 32.50c.
Babbitt metal, commercial grades	25.00c. to 65.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33¼ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse Delivered Prices per Lb.	
Tin, Straits pig	54.25c.

Tin, bar	56.25c.
Copper, Lake	14.12½c. to 14.25c.
Copper, electrolytic	14.12½c. to 14.25c.
Copper, castings	13.87½c. to 14.00c.
Zinc, slabs	6.50c. to 6.75c.
Lead, American pig	6.50c. to 6.60c.
Lead, bar	9.25c.
Antimony, Asiatic	16.50c.
Babbitt metal, medium grade	21.50c.
Babbitt metal, high grade	58.25c.
Solder, ½ and ½	33.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	10.12½c.	10.87½c.
Copper, hvy. and wire	10.00c.	10.50c.
Copper, light and bottoms	9.00c.	9.25c.
Brass, heavy	6.12½c.	6.75c.
Brass, light	5.25c.	6.00c.
Hvy. machine composition	9.25c.	9.75c.
No. 1 yel. brass turnings	7.37½c.	7.87½c.
No. 1 red brass or compos. turnings	8.87½c.	9.37½c.
Lead, heavy	5.00c.	5.37½c.
Cast aluminum	12.12½c.	13.25c.
Sheet aluminum	13.25c.	14.75c.
Zinc	3.00c.	3.37½c.

Lead

Opening of producers' books yesterday for March delivery brought in no additional inquiry for pig lead, the floods and the automobile strike having induced cautiousness among consumers. Some shipments have been delayed, and the automobile strike particularly has restrained consumption by battery makers. A reliable estimate places January lead shipments at between 41,000 and 42,000 tons, against 34,590 tons for January a year ago and 33,695 tons for January, 1935. This volume, however, will be under December's shipments of 51,646 tons. With the current month's requirements about 75 per cent covered, demand is rather quiet. The price holds unchanged and firm at 6.00c. a lb., New York, and 5.85c., St. Louis.

Zinc

The undertone strengthened further last week, as shipments of spelter increased to 8700 tons from 7200 tons in the preceding week. Sales were around 2000 tons, but fail to indicate current demand which appears to be exceeding the supply. Supplies of high grade zinc are especially tight. Owing to extremely low stocks of high grade and a continued production tie-up in the Montana mining area due to adverse weather, consumer discomfort has increased to the point where resort is being had to commoner grades where possible. The zinc market as a whole has drawn considerable strength from the supply situation, and, while prices are unchanged at 6.00c. a lb.

Tin

United States deliveries of tin in January totaled 7615 tons, against 6930 tons in December. This was the largest January tonnage since 1929. World visible supplies, including the Eastern and Arnhem carry-over, increased 2392 tons during the month to 26,179 tons, but tin markets were little affected by this news. Domestic conditions, partly due to the automobile strike, have been dull lately, though fair volume of buying occurred on a declining market last week as the spot price at New York broke through 50c. on Jan. 29. With the spot Straits quotation up again today to 50.50c., dullness has returned. Standard quotations in London this morning were £227 cash and £227 15s. three-months. The Eastern price was £228 2s. 6d.

December Averages

Electrolytic copper, Conn.*	12.660c. a lb.
Lake copper, Eastern delivery	12.785c. a lb.
Straits tin, spot, New York	50.905c. a lb.
Zinc, East St. Louis	5.850c. a lb.
Zinc, New York	6.200c. a lb.
Lead, St. Louis	5.850c. a lb.
Lead, New York	6.000c. a lb.

*Price ¼c. lower in New York.



IRON AND STEEL SCRAP

... Advance of 25c. at Chicago lifts composite to \$18.92.

• • •

... Prices tested by active consumer buying in important districts.

Several Chicago mills came into the market last week for sizable commitments resulting in a moderate upward price reaction, which in turn lifted the composite figure by 9c. to a level of \$18.92 a gross ton. Market undertone in Pittsburgh and eastern Pennsylvania is very strong, but the situation is considerably less buoyant in the Cleveland area and in districts affected by the flood, such as Cincinnati. All Atlantic ports report active buying for export, and this outlet will probably remain open for some time to come, inasmuch as brokers are loaded with heavy orders.

Pittsburgh

A moderate-sized tonnage of No. 1 steel was sold into consumption this week at \$19.50. Although most large consumers are still out of the market, the undertone continues exceptionally strong. Brokers welcome the inactivity as it is enabling them to cover their shortages, but they are not able to pick up tonnages in any great quantity. The market in this district is more or less in a "pocket," as no scrap is coming in from the East or West. One or two substantial purchases would undoubtedly result in higher quotations. Specialties are up 50c.

Chicago

Heavy melting steel has moved up another notch to \$19.25 a gross ton, delivered. In some instances mill buying has been very heavy, sufficiently so that some of the large consumers may now stay out of the market for a matter of 30 days or so. Open winter weather continues to permit an even and steady flow of scrap, and brokers do not expect the break in spring prices which usually follows the loosening of winter's grip. The Ohio River flood has had no outward effect on the Chicago market, though it is certain that the normal flow of scrap to mills east of Chicago has been somewhat interrupted and possibly some scrap south of the

flooded area is now moving to seaboard for export.

Cleveland

The market has a slightly easier tone, but there was no consumer buying during the week to test prices, and quotations are unchanged. Mild weather has made the handling of scrap much easier than usual during the winter months, and this has tended to make supplies more plentiful. Brokers are of the opinion that the placing of substantial orders by consumers at the present time would not force prices to higher levels. New York Central and Erie railroads have scrap lists out, on which bids are due Feb. 4.

Philadelphia

The recent spectacular price advance for steel-making grades came to a standstill here this week, as last week's quotation of \$18.50 for No. 1 was reaffirmed. No. 2 steel, however, is further strengthened by reports of \$18 sales, and now is priced at \$17.50 to \$18. Dealers' buying prices for export remain at \$18 and \$17. About 3500 tons of new bundles from the Edward G. Budd Mfg. Co. brought about \$18.25, f.o.b. cars, from the Pencoyd consumer. Other district mills are expected to enter the market soon, and, if export levels remain the same, may be forced to better present quotations to obtain their supplies. Bethlehem Steel Co., however, states its buying prices have been reduced to \$17.50 to \$17.75 for No. 1 and to \$16.50 to \$16.75 for No. 2 steel.

Detroit

This market shows increased strength, and bids on all plants lists advanced approximately 50c. a ton over previous lists. Yard scrap shows fewer signs of strength. Active items are borings and turnings and other blast furnace grades, which are now being used in open-hearth charges. Chicago prices now make it feasible to buy scrap at Detroit to await water shipment in the spring.

Buffalo

This market is holding its own without any sizable transactions being reported. Dealers are busy assembling material on recent large orders. It is reported that up to \$17 has been paid for cupola cast scrap.

Boston

Scrap prices have undergone some adjustment due to particular developments. No. 1 and 2 steel export prices are firmer, while these grades for Pittsburgh delivery are easier because mills are more discriminating. Freer offerings of machinery and textile scrap have resulted in price recessions. Prices for steel turnings, bundled skeleton and blast furnace scrap are firmer. Cleaned engine blocks are strong at \$11.75 a ton on cars, and uncleaned blocks are \$10, but indications are consumers are now well stocked. Three cargoes left for Europe and Japan this week. The field for export is expanding, recent shipments to Holland and Germany being noted.

New York

Supplies are moving freely, but are being readily absorbed by mills which continue to melt in heavy volume against heavy accumulations of orders for finished steel products. The market is additionally supported by active foreign buying, and dealers are now paying \$14 flat for heavy melting steel, delivered alongside barges. No. 1 steel for domestic shipment is priced at \$14 to \$15.

Cincinnati

Dealers report small urgent orders but no appreciable new business. Shipments are being maintained on contract to those mills in operation, but movement of scrap to flooded areas is curtailed. Yards are flooded, and dealers are rerouting incoming cars to handle contract coverage and current business.

St. Louis

The week's market was quiet, and prices are unchanged. While several deals are pending between dealers and mills, no sales of consequence have been made inasmuch as buyers and sellers cannot agree on price.

Liquidation into the parent corporation of three subsidiaries of the Dravo Corp., Pittsburgh, has been announced. The three units involved were the Dravo Contracting Co., Kenstone Sand & Supply Co. and Dravo Realty Co. Business previously done by the named subsidiaries will be transacted through established divisions of the corporation, and both operating and marketing economies are expected.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$19.00 to \$19.50
No. 2 hvy. mltng. steel.	17.25 to 17.75
No. 2 RR. wrought	19.00 to 19.50
Scrap rails	20.00 to 20.50
Rails, 3 ft. and under	22.50 to 23.00
Comp. sheet steel	19.00 to 19.50
Hand. bundled sheets	18.00 to 18.50
Hvy. steel axle turn.	17.50 to 18.00
Machine shop turn.	14.00 to 14.50
Short shov. turn.	14.50 to 15.00
Mixed bor. & turn.	13.50 to 14.00
Cast iron borings	14.00 to 14.50
Cast iron carwheels	18.00 to 18.50
Hvy. breakable cast.	15.00 to 15.50
No. 1 cast	17.50 to 18.00
RR. knuckles & cplrs.	25.00 to 25.50
Rail coll & leaf springs	25.00 to 25.50
Rolled steel wheels	25.00 to 25.50
Low phos. billet crops	25.00 to 25.50
Low phos. sh. bar.	24.50 to 25.00
Low phos. punchings	24.00 to 24.50
Low phos. plate scrap	24.00 to 24.50
Steel car axles	23.50 to 24.00

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$17.25 to \$17.75
No. 2 hvy. mltng. steel.	16.25 to 16.75
Comp. sheet steel	16.50 to 17.00
Light bund. stampings	13.00 to 13.50
Drop forge flashings	16.50 to 17.00
Machine shop turn.	12.00 to 12.50
Short shov. turn.	12.00 to 12.50
No. 1 busheling	16.00 to 16.50
Steel axle turnings	15.00 to 15.50
Low phos. billet crops	22.00 to 22.50
Cast iron borings	12.50 to 13.00
Mixed bor. & turn.	12.50 to 13.00
No. 2 busheling	12.50 to 13.00
No. 1 cast	18.50 to 19.00
Railroad grate bars	12.00 to 12.50
Stove plate	10.00 to 10.50
Rails under 3 ft.	22.00 to 22.50
Rails for rolling	20.00 to 20.50
Railroad malleable	18.00 to 18.50
Cast iron carwheels	18.50 to 19.00

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$18.50
No. 2 hvy. mltng. steel.	\$17.50 to 18.00
Hydraulic bund., new	18.00 to 18.50
Hydraulic bund., old.	16.00 to 16.50
Steel rails for rolling	18.50 to 19.00
Cast iron carwheels	18.50 to 19.00
Hvy. breakable cast	18.00
No. 1 cast	19.00 to 19.50
Stove plate (steel wks.)	15.00
Railroad malleable	18.00 to 18.50
Machine shop turn.	12.50 to 13.00
No. 1 blast furnace	11.00 to 11.50
Cast borings	11.00 to 11.50
Heavy axle turnings	16.50 to 17.00
No. 1 low phos. hvy.	22.50 to 23.00
Couplers & knuckles	22.50 to 23.00
Rolled steel wheels	22.50 to 23.00
Steel axles	23.00 to 23.50
Shafting	22.50 to 23.00
No. 1 RR. wrought	17.00 to 17.50
Spec. iron & steel pipe	15.50 to 16.00
No. 1 forge fire	16.50 to 17.00
Cast borings (chem.)	12.00 to 13.00

CHICAGO

Delivered to Chicago district consumers:	
Per Gross Ton	
Hvy. mltng. steel	\$18.75 to \$19.25
Auto. hvy. mltng. steel	17.00 to 17.50
Alloy free	16.50 to 17.00
Shoveling steel	18.75 to 19.25
Hydraul. comp. sheets	18.25 to 18.50
Drop forge flashings	15.50 to 16.00
No. 1 busheling	16.75 to 17.25
Rolled carwheels	20.50 to 21.00
Railroad tires, cut	20.50 to 21.00
Railroad leaf springs	20.50 to 21.00
Axle turnings	17.50 to 18.00
Steel coup. & knuckles	20.00 to 20.50
Coil springs	22.50 to 23.00
Axle turn. (elec.)	18.50 to 19.00
Low phos. punchings	22.00 to 22.50
Low phos. plates, 12 in. and under	22.00 to 22.50
Cast iron borings	10.50 to 11.00
Short shov. turnings	11.50 to 12.00
Machine shop turn.	10.00 to 10.50
Rero'ling rails	20.75 to 21.25
Steel rails under 3 ft.	21.00 to 21.50
Steel rails under 2 ft.	22.50 to 23.00
Angle bars, steel	20.50 to 21.00
Cast iron carwheels	18.50 to 19.00
Railroad malleable	20.50 to 21.00
Agric. malleable	17.00 to 17.50
Per Net Ton	
Iron car axles	20.50 to 21.00

Steel car axles	\$22.00 to \$22.50
No. 1 RR. wrought	16.75 to 17.25
No. 2 RR. wrought	16.50 to 17.00
No. 2 busheling, old.	9.00 to 9.50
Locomotive tires	17.00 to 17.50
Pipes and flues	14.00 to 14.50
No. 1 machinery cast	16.00 to 16.50
Clean auto. cast	15.00 to 15.50
No. 1 railroad cast	15.00 to 15.50
No. 1 agric. cast	12.50 to 13.00
Stove plate	10.50 to 11.00
Grate bars	12.50 to 13.00
Brake shoes	12.50 to 13.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mltng. steel.	\$18.50 to \$19.00
No. 2 hvy. mltng. steel.	17.00 to 17.25
Scrap rails	17.50 to 18.00
New hy. b'ndled sheet	17.00 to 17.25
Old hydraul. bundles	14.00 to 14.50
Drop forge flashings	17.00 to 17.25
No. 1 busheling	17.00 to 17.25
Hvy. axle turnings	11.00 to 11.50
Machine shop turn	12.50 to 12.75
Knuckles & couplers	20.50 to 21.00
Coil & leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet crops	20.50 to 21.00
Shov. turnings	12.25 to 12.75
Mixed bor. & turn.	11.75 to 12.25
Cast iron borings	11.75 to 12.25
Steel car axles	20.50 to 21.00
No. 1 machinery cast	17.00 to 17.50
No. 1 cupola cast	16.25 to 16.75
Stove plate	13.00 to 13.50
Steel rails under 3 ft.	20.00 to 20.50
Cast iron carwheels	16.00 to 16.50
Railroad malleable	18.50 to 17.50
Chemical borings	13.00 to 13.50

BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	\$12.50 to \$13.00
Scrap steel rails	12.50 to 13.00
Short shov. turnings	8.00
Stove plate	8.50
Steel axles	15.00
Iron axles	15.00
No. 1 RR. wrought	10.00
Rails for rolling	14.00
No. 1 cast	13.50
Tramcar wheels	13.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:	
Selected hvy. steel	\$16.50 to \$17.00
No. 1 hvy. melting	15.50 to 16.00
No. 2 hvy. melting	14.50 to 15.00
No. 1 locomotive tires	15.50 to 16.00
Misc. stand.-sec. rails	16.75 to 17.25
Railroad springs	19.00 to 19.50
Bundled sheets	10.50 to 11.00
No. 2 RR. wrought	15.50 to 16.00
No. 1 busheling	8.50 to 9.00
Cast bor. & turn.	5.50 to 6.00
Rails for rolling	17.50 to 18.00
Machine shop turn.	6.00 to 6.50
Heavy turnings	10.50 to 11.00
Steel car axles	21.00 to 21.50
Iron car axles	22.00 to 22.25
No. 1 RR. wrought	13.50 to 14.00
Steel rails under 3 ft.	17.50 to 18.00
Steel angle bars	16.75 to 17.25
Cast iron carwheels	16.00 to 16.50
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	17.50 to 18.00
No. 1 railroad cast	13.25 to 13.75
Stove plate	11.25 to 11.75
Agricul. malleable	12.50 to 13.00
Grate bars	11.00 to 11.50
Brake shoes	13.00 to 13.50

CINCINNATI

Dealer's buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$15.00 to \$16.00
No. 2 hvy. mltng. steel.	12.75 to 13.25
Scrap rails for mltng.	15.50 to 16.00
Loose sheet clippings	9.50 to 10.00
Bundled sheets	11.50 to 12.00
Cast iron borings	7.50 to 8.00
Machine shop turns	8.50 to 9.00
No. 1 busheling	12.00 to 12.50
No. 2 busheling	7.50 to 8.00
Rails for rolling	16.00 to 16.50
No. 1 locomotive tires	13.75 to 14.25
Short falls	18.75 to 19.25
Cast iron carwheels	14.75 to 15.25
No. 1 machinery cast	15.75 to 16.25
No. 1 railroad cast	14.75 to 15.25
Burnt cast	10.75 to 11.25
Stove plate	10.75 to 11.25
Agricul. malleable	14.75 to 15.25
Railroad malleable	16.25 to 16.75

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$14.50 to \$15.00
No. 2 hvy. mltng. steel.	13.75 to 14.25
Borings and turnings	11.25 to 11.75
Long turnings	10.50 to 11.00
Short shov. turnings	11.75 to 12.25
No. 1 machinery cast	15.00 to 15.50
Automotive cast	16.25 to 16.75
Hydraul. comp. sheets	16.00 to 16.50
Stove plate	9.25 to 9.75
New factory bushel	15.00 to 15.50
Old No. 2 busheling	9.50 to 10.00
Sheet clippings	12.00 to 12.50
Flashings	14.50 to 15.00
Low phos. plate scrap	16.50 to 17.00

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$18.50 to \$19.00
Hydraulic bundles	18.25 to 18.75
Machine shop turn.	14.00 to 14.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$14.00 to \$15.00
No. 2 hvy. mltng. steel.	13.00 to 14.00
Hvy. breakable cast	13.50 to 14.00
No. 1 machinery cast	15.00 to 15.50
No. 2 cast	12.00 to 12.50
Stove plate	10.50 to 11.00
Steel car axles	20.50 to 21.50
Shafting	17.00 to 18.00
No. 1 RR. wrought	12.50 to 13.00
No. 1 wrought long	11.50 to 12.00
Spec. iron & steel pipe	12.00 to 12.50
Rails for rolling	15.50 to 16.00
Clean steel turnings	8.25 to 8.75
Cast borings	8.50 to 8.75
No. 1 blast furnace	7.00 to 7.50
Cast borings (chem.)	11.00 to 11.50
Unprepar. yard scrap	8.50 to 9.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast.	\$16.00 to \$16.50
No. 1 hvy. cast cupola	12.50 to 13.00
No. 2 cast	11.50 to 12.00

Add 25c. to 50c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$13.30 to \$13.80
Scrap rails	13.30 to 13.80
No. 2 steel	11.55 to 12.05
Breakable cast	13.00
Machine shop turn.	8.30
Unmixed bor. & turn.	7.00 to 8.25
Bund. skeleton long	11.80
Shafting	16.75 to 17.00
Cast bor. chemical	7.00 to 8.75
Per gross ton delivered consumers' yards:	
Textile cast	\$13.25 to \$14.50
No. 1 machine cast	13.75 to 15.00
Stove plate	10.00 to 10.50

EXPORT

Dealers' buying prices per gross ton:	
New York, delivered alongside barges	
No. 1 hvy. mltng. steel.	\$14.00
No. 2 hvy. mltng. steel.	13.00
No. 2 cast	12.00
Stove plate	\$10.50 to 11.00
Rails (scrap)	13.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	\$16.00 to \$16.25
No. 2 hvy. mltng. steel.	15.00 to 15.25
Rails (scrap)	16.00 to 16.50
Stove plate	\$7.75 to 8.00

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel.	\$18.00
No. 2 hvy. mltng. steel.	17.00

New Orleans, on cars at Stuyvesant Dock

No. 1 hvy. mltng. steel.	\$14.25
No. 2 hvy. mltng. steel.	13.25

Los Angeles, on cars or trucks at local piers

No. 1 hvy. mltng. steel.	\$10.50 to \$11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Lb.
 Rerolling\$34.00
 Forging quality 40.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
 Open-hearth or Besse-
 mer\$34.00

Skeps

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
 Grooved, universal and
 sheared1.80c.

Wire Rods

(No. 5 to 15/32 in.)

Per Gross Ton
 F.o.b. Pittsburgh or Cleveland.....\$43.00
 F.o.b. Chicago, Youngstown or
 Anderson, Ind. 44.00
 F.o.b. Worcester, Mass. 45.00
 F.o.b. Birmingham 46.00
 F.o.b. San Francisco 52.00
 F.o.b. Galveston 49.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.
 F.o.b. Pittsburgh 2.20c.
 F.o.b. Chicago or Gary 2.25c.
 F.o.b. Duluth 2.35c.
 Del'd Detroit 2.35c.
 F.o.b. Cleveland 2.25c.
 F.o.b. Buffalo 2.30c.
 Del'd Philadelphia 2.51c.
 Del'd New York 2.55c.
 F.o.b. Birmingham 2.35c.
 F.o.b. cars dock Gulf ports.... 2.60c.
 F.o.b. cars dock Pacific ports.... 2.75c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 2.05c.
 F.o.b. Cleveland, Chicago, Gary
 or Moline, Ill. 2.10c.
 F.o.b. Buffalo 2.15c.
 F.o.b. Birmingham 2.20c.
 F.o.b. cars dock Gulf ports.... 2.45c.
 F.o.b. cars dock Pacific ports.... 2.60c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.25c.
 F.o.b. Buffalo, Cleveland,
 Youngstown, Chicago, Gary
 or Birmingham 2.30c.
 Del'd Detroit 2.40c.
 F.o.b. cars dock Gulf ports 2.65c.
 F.o.b. cars dock Pacific ports.... 2.65c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.10c.
 F.o.b. Buffalo, Cleveland,
 Youngstown, Chicago, Gary
 or Birmingham 2.15c.
 F.o.b. cars dock Gulf ports.... 2.50c.
 F.o.b. cars dock Pacific ports.... 2.50c.

Iron

F.o.b. Chicago 2.15c.
 F.o.b. Pittsburgh (refined) 3.25c.

Cold Finished Bars and Shafting*

Base per Lb.
 F.o.b. Pittsburgh 2.55c.
 F.o.b. Cleveland, Chicago and
 Gary 2.60c.
 F.o.b. Buffalo 2.65c.
 Del'd Detroit 2.70c.
 Del'd eastern Michigan 2.75c.

* In quantities of 10,000 to 19,999 lb.

Plates

Base per Lb.
 F.o.b. Pittsburgh 2.05c.
 F.o.b. Chicago or Gary 2.10c.
 Del'd Cleveland 2.235c.
 F.o.b. Coatesville or Spar. Pt. 2.15c.
 Del'd Philadelphia 2.235c.
 Del'd New York 2.33c.
 F.o.b. Birmingham 2.20c.
 F.o.b. cars dock Gulf ports.... 2.45c.

F.o.b. cars dock Pacific ports.. 2.60c.
 Wrought iron plates, f.o.b.
 Pittsburgh 3.20c.

Floor Plates

F.o.b. Pittsburgh 3.60c.
 F.o.b. Chicago 3.65c.
 F.o.b. Coatesville 3.70c.
 F.o.b. cars dock Gulf ports.... 4.00c.
 F.o.b. cars dock Pacific ports.. 4.15c.

Structural Shapes

Base per Lb.
 F.o.b. Pittsburgh 2.05c.
 F.o.b. Chicago 2.10c.
 Del'd Cleveland 2.235c.
 F.o.b. Buffalo or Bethlehem.. 2.15c.
 Del'd Philadelphia 2.255c.
 Del'd New York 2.305c.
 F.o.b. Birmingham (standard) 2.20c.
 F.o.b. cars dock Gulf ports.... 2.45c.
 F.o.b. cars dock Pacific ports.. 2.60c.

Steel Sheet Piling

Base per Lb.
 F.o.b. Pittsburgh 2.40c.
 F.o.b. Chicago or Buffalo 2.50c.
 F.o.b. cars dock Gulf or Pacific
 Coast ports 2.85c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than
 60 lb. per gross ton\$39.00
 Angle bars, per 100 lb. 2.55c. to 2.70c.

F.o.b. Basing Points

Light rails (from billets) per
 gross ton\$38.00
 Light rails (from rail steel) per
 gross ton 37.00

Base per 100 Lb.

Spikes2.90c.
 Tie plates, steel2.10c.
 Tie plates, Pacific Coast ports..2.20c.
 Track bolts, to steam railroads.4.00c.
 Track bolts, to jobbers, all sizes
 (per 100 counts)

65-5-5 per cent off list
 Basing points on light rails are Pittsburgh,
 Chicago and Birmingham; on spikes and tie
 plates, Pittsburgh, Chicago, Portsmouth, Ohio,
 Weirton, W. Va., St. Louis, Kansas City,
 Minnequa, Colo., Birmingham and Pacific Coast
 ports; on tie plates alone, Steelton, Pa.,
 Buffalo; on spikes alone, Youngstown, Lebanon,
 Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE,

TERNE PLATE

Sheets

Hot Rolled

Base per Lb.
 No. 10, f.o.b. Pittsburgh2.15c.
 No. 10, f.o.b. Gary 2.25c.
 No. 10, del'd Detroit2.35c.
 No. 10, del'd Philadelphia2.46c.
 No. 10, f.o.b. Birmingham2.30c.
 No. 10, f.o.b. cars dock Pacific
 ports2.70c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh2.80c.
 No. 24, f.o.b. Gary 2.90c.
 No. 24, del'd Detroit3.00c.
 No. 24, del'd Philadelphia3.11c.
 No. 24, f.o.b. Birmingham2.95c.
 No. 24, f.o.b. cars dock Pacific
 ports3.45c.
 No. 24, wrought iron, Pitts-
 burgh4.50c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh..2.80c.
 No. 10 gage, f.o.b. Gary 2.90c.
 No. 10 gage, f.o.b. Detroit 3.00c.
 No. 10 gage, del'd Philadelphia.3.11c.
 No. 10 gage, f.o.b. Birmingham.2.95c.
 No. 10 gage, f.o.b. cars dock
 Pacific ports3.40c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh...3.25c.
 No. 20 gage, f.o.b. Gary3.35c.
 No. 20 gage, del'd Detroit3.45c.
 No. 20 gage, del'd Philadelphia.3.56c.
 No. 20 gage, f.o.b. Birmingham.3.40c.
 No. 20 f.o.b. cars dock Pacific
 ports3.80c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh..3.40c.
 No. 24, f.o.b. Gary 3.50c.
 No. 24, del'd Philadelphia3.71c.
 No. 24, f.o.b. Birmingham3.55c.
 No. 24, f.o.b. cars dock Pacific
 ports4.00c.
 No. 24, wrought iron, Pitts-
 burgh5.15c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.

Field grade3.20c.
 Armature3.55c.
 Electrical4.05c.
 Special Motor5.10c.
 Special Dynamo5.80c.
 Transformer6.30c.
 Transformer Special7.30c.
 Transformer Extra Special7.80c.

Silicon Strip in coils—Sheet price
 plus silicon sheet extra width extras
 plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating
 f.o.b. Pittsburgh3.70c.
 F.o.b. Gary3.80c.
 F.o.b. cars dock Pacific ports..4.40c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh3.20c.
 No. 20, f.o.b. Gary3.30c.
 No. 20, f.o.b. Birmingham3.80c.
 No. 20, f.o.b. cars dock Pacific
 ports3.80c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh2.95c.
 No. 28, Gary3.05c.
 No. 28, cars dock Pacific ports,
 boxed3.325c.

Tin Plate

Base per Box

Standard cokes, f.o.b. Pitts-
 burgh district mill\$4.85
 Standard cokes, f.o.b. Gary 4.95

Above quotations practically the
 equivalent of previous quotations
 owing to new method of quoting,
 effective Jan. 1, 1937.

Special Coated Manufacturing Ternes

Manufacturing Ternes

Per Base Box
 F.o.b. Pittsburgh\$4.15
 F.o.b. Gary 4.25

* Customary 7½ per cent discount in effect
 through 1936 discontinued as of Jan. 1, 1937.

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.....\$10.00
 15-lb. coating I.C..... 12.00
 20-lb. coating I.C..... 13.00
 25-lb. coating I.C..... 14.00
 30-lb. coating I.C..... 15.25
 40-lb. coating I.C..... 17.50

Hot-Rolled Hoops, Bands, Strip and

Flats under ¼ in.

Base per Lb.

All widths up to 24 in., Pitts-
 burgh 2.15c.
 All widths up to 24 in., Chicago 2.25c.
 All widths up to 24 in., del'd
 Detroit 2.35c.
 All widths up to 24 in.,
 Birmingham 2.30c.
 Cooperage stock, Pittsburgh.. 2.25c.
 Cooperage stock, Chicago 2.35c.

Cold-Rolled Strip*

Base per Lb.

F.o.b. Pittsburgh 2.85c.
 F.o.b. Cleveland 2.85c.
 Del'd Chicago 3.13c.
 F.o.b. Worcester 3.05c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

Pittsburgh

and

Cleveland and Worcester

Carbon 0.25-0.50% 2.85c. 3.05c.
 Carbon .51-.75 3.95c. 4.15c.
 Carbon .76-1.00 5.70c. 5.90c.
 Carbon Over 1.00 7.75c. 7.95c.

Fender Stock

No. 14, Pitts'gh or Cleveland 3.10c.
 No. 14, Worcester 3.50c.
 No. 20, Pitts'gh or Cleveland. 3.50c.
 No. 20, Worcester 3.90c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)
To Manufacturing Trade

Per Lb.
Bright wire2.60c.
Spring wire3.20c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade

Base per Keg
Standard wire nails\$2.25
Smooth coated nails2.25

Base per 100 Lb.
Annealed fence wire\$2.90
Galvanized fence wire3.30
Polished staples2.95
Galvanized staples3.20
Barbed wire, galvanized2.75
Twisted barless wire2.75
Woven wire fence, base column.63.00
Single loop bale ties, base column55.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe
Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld		Wrought Iron	
In.	Black Galv.	In.	Black Galv.
1/4	57 37	1/4 & 3/8	+6 +26
1/2	60 44 1/2	1/2	27 10 1/2
3/4	64 1/2 55	3/4	32 16
1	67 1/2 59	1 & 1 1/4	35 21
1 to 3	69 1/2 61 1/2	1 1/2	39 23 1/2
		2	38 1/2 23

Lap Weld		Wrought Iron	
In.	Black Galv.	In.	Black Galv.
2	62 53 1/2	2	32 1/2 18
2 1/2	3.65 56 1/2	2 1/2 to 3 1/2	33 1/2 20 1/2
3 1/2	6.67 58 1/2	4 to 8	35 1/2 24
7 & 8	8.66 56 1/2	9 to 12	28 1/2 15
9 & 10	65 1/2 56		
11 & 12	64 1/2 55		

Butt Weld, extra strong, plain ends		Wrought Iron	
In.	Black Galv.	In.	Black Galv.
1/4	55 1/2 42 1/2	1/4 & 3/8	+7 +39
1/2	57 1/2 46 1/2	1/2	28 13
3/4	62 1/2 54 1/2	3/4	33 18
1	66 1/2 58 1/2	1 to 2	39 24 1/2
1 to 3	68 61		

Lap Weld, extra strong, plain ends		Wrought Iron	
In.	Black Galv.	In.	Black Galv.
2	60 52 1/2	2	35 1/2 21 1/2
2 1/2	3.64 56 1/2	2 1/2 to 4 1/2	28 1/2
3 1/2	6.67 60	4 1/2 to 6	40 1/2 28
7 & 8	66 1/2 57	7 & 8	41 1/2 28 1/2
9 & 10	65 1/2 56	9 to 12	32 20 1/2
11 & 12	64 1/2 55		

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes
Seamless Steel Commercial Boiler Tubes and Locomotive Tubes
(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G. \$ 8.60	\$ 7.82
1 1/4 in. o.d.	13 B.W.G. 10.19	9.26
1 1/2 in. o.d.	13 B.W.G. 11.26	10.23
1 3/4 in. o.d.	13 B.W.G. 12.81	11.64
2 in. o.d.	13 B.W.G. 14.35	13.04
2 1/4 in. o.d.	13 B.W.G. 16.00	14.54
2 1/2 in. o.d.	12 B.W.G. 17.61	16.01
2 3/4 in. o.d.	12 B.W.G. 19.29	17.54
3 in. o.d.	12 B.W.G. 20.45	18.59

3 in. o.d.	12 B.W.G.	\$21.45	\$19.50
4 1/4 in. o.d.	10 B.W.G.	41.08	37.35
3 1/2 in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4 1/2 in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.90

Extra for less-carload quantities:
25,000 lb. or ft. to 39,999 lb. or ft. 5 %
12,000 lb. or ft. to 24,999 lb. or ft. 12 1/2 %
6,000 lb. or ft. to 11,999 lb. or ft. 25 %
2,000 lb. or ft. to 5,999 lb. or ft. 35 %
Under 2,000 lb. or ft.50 %

CAST IRON WATER PIPE

Per Net Ton	
*6-in. and larger, del'd Chicago	\$50.00
6-in. and larger, del'd New York	48.00
*6-in. and larger, Birmingham	42.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	50.50
F.o.b. dock, Seattle	50.50
4-in. f.o.b. dock, San Francisco or Los Angeles	53.50
F.o.b. dock, Seattle	53.50

Class "A" and gas pipe, \$3 extra.
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$41, Birmingham, and \$49.50, delivered Chicago; and 4-in. pipe, \$44, Birmingham, and \$52.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List
Machine and carriage bolts:
1/2 in. x 6 in. and smaller70
Larger than 1/2 in.65 and 10
Lag bolts65 and 10
Plow bolts, Nos. 1, 2, 3, and 7 heads65, 10 and 10
Hot-pressed nuts, blank or tapped, square65 and 10
Hot-pressed nuts, blank or tapped, hexagon65 and 10
C.p.c. and t. square or hex. nuts, blank or tapped65 and 10
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes 60, 20 and 5

Stove bolts in packages, nuts attached72 1/2
Stove bolts in packages, with nuts separate72 1/2 and 5
Stove bolts in bulk81 1/2
On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets
(1/2-in. and larger)

Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland..\$3.25
F.o.b. Chicago or Birmingham.. 3.35

Small Rivets
(7/16-in. and smaller)

Per Cent Off List
F.o.b. Pittsburgh70 and 5
F.o.b. Cleveland70 and 5
F.o.b. Chicago and Birm'g'm.70 and 5

Cap and Set Screws
(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller 75
Milled headless set screws, cut thread 3/4 in. and smaller75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller60
Upset set screws, cup and oval points75
Milled studs65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$55 a gross ton.

Alloy Steel Bars
F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base2.75c.
Delivered, Detroit2.90c.

S.A.E. Alloy
Series Differential
Numbers per 100 lb.

2000 (1 1/2 % Nickel)	\$0.25
2100 (1 1/4 % Nickel)	0.55
2300 (3 1/2 % Nickel)	1.50
2500 (5 % Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel.....base	
6100 Chromium Vanadium Bar.1.10c.	
6100 Chromium Vanadium Spring Steel.....	0.70
Chromium Nickel Vanadium.....	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric turned steel is 50c. higher. The differential for cold-drawn bars 1/2c. per lb. higher with separate extras. Blooms, billets and slabs under 4 1/4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars
F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.25c. base per lb. Delivered Detroit, 3.40c.

STAINLESS STEEL No. 302
(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)
(Base Prices f.o.b. Pittsburgh)

Per Lb.	
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20 1/2 c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL TEEL

Base Per Lb.	
High speed	60c.
High carbon chrome	39c.
Oil hardening	22c.
Special	20c.
Extra	16 1/2 c.
Regular	13c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports
Ferromanganese, export .. £9
Billets, open-hearth£6 to £6 5s.
Tin plate, per base box £1 11s. 6d.

Steel bars, open-hearth....	£8 10s.
Beams, open-hearth	£8 5s.
Channels, open-hearth ...	£8 10s.
Angles, open-hearth	£8 5s.
Black sheets, No. 24 gage.	£11 7 1/2 s.
Galvanized sheets, No. 24 gage	£13 17 1/2 s.

CONTINENTAL

Per Metric Ton, Gold £, f.o.b. Continental Ports

Current dollar equivalent is ascertained by multiplying gold pound prices by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£3 4s. 6d.
Wire rods, No. 5 B.W.G....	£4 10s.
Steel bars, merchant	£3 15s. 6d.
Sheet bars	£2 15s. 6d.
Plate, 1/4 in. and up.....	£6 14s.
Plate, 3/16 in. and 5 mm. .	£5
Sheet, 1/4 in.	£5 5s.
Beams, Thomas	£3 2s. 6d.
Angles (Basic)	£3 2s. 6d.
Hoops and strip, base.....	£4
Wire, plain, No. 8.....	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4 pt. No. 10 B.W.G.	£8 15s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.40c.
Structural shapes	3.40c.
Soft steel bars and small shapes	3.30c.
Reinforcing steel bars	3.30c.
Cold-finished and screw stock:	
Rounds and hexagons	3.80c.
Squares and flats	3.80c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	2.50c.
Hoops	4.00c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.65c.
Galv. sheets (No. 24), 25 or more bundles	4.25c.
Hot-rolled sheets (No. 10)	3.25c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.94
Spikes, large	3.25c.

	Per Cent Off List
Track bolts, all sizes, per 100 count	60
Machine bolts, 100 count	65-5
Carriage bolts, 100 count	65-5
Nuts, all styles, 100 count	65-5
Large rivets, base per 100 lb.	\$3.75
Wire, black, soft ann'd, base per 100 lb.	3.15c.
Wire, galv. soft, base per 100 lb.	3.55c.
Common wire nails, per keg	2.50c.
Cement coated nails, per keg	2.50c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.45c.
Soft steel bars, rounds	3.35c.
Soft steel bars, squares and hexagons	3.50c.
Cold-fin. steel bars:	
Rounds and hexagons	3.95c.
Flats and squares	3.95c.
Hot-rolled strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.65c.
Spikes (keg lots)	4.00c.
Track bolts (keg lots)	5.10c.
Rivets, structural (keg lots)	4.10c.
Rivets, boiler (keg lots)	4.10c.

	Per Cent Off List
Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	80
Cut point set screws	75 and 10
Flat head bright wood screws	62 and 20
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	\$4.00 off list
Black ann'd wire per 100 lb.	\$4.05
Com. wire nails, 15 kegs or more	2.70c.
Cement c'd nails, 15 kegs or more	2.70c.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.65c.
Structural shapes	3.62c.
Soft steel bars, rounds	3.62c.
Iron bars, Swed. char. coal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.22c.
Flats and squares	4.22c.
Cold-rolled: strip, soft and quarter hard	3.57c.

Hoops	3.82c.
Bands	3.82c.
Hot-rolled sheets (No. 10)	3.57c.
Hot-rolled ann'd sheets (No. 24*)	4.22c.
Galvanized sheets (No. 24*)	4.82c.
Long terme sheets (No. 24)	5.55c.
Armco iron, galv. (No. 24†)	5.85c.
Toncan iron, galv. (No. 24†)	5.85c.
Galvannealed (No. 24†)	5.95c.
Armco iron, hot-rolled annealed (No. 24†)	5.30c.
Toncan iron, hot-rolled annealed (No. 24†)	5.30c.
Armco iron hot-rolled (No. 10†)	4.35c.
Toncan iron, hot-rolled (No. 10†)	4.35c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	4.85c.
Deep drawing	5.50c.
Stretcher leveled	5.50c.
SAE, 2300, hot-rolled	7.32c.
SAE, 3100, hot-rolled	5.72c.
SAE, 6100 hot-rolled, annealed	9.92c.
SAE, 2300, cold-rolled	8.30c.
SAE, 3100, cold-rolled, annealed	7.75c.
Floor plate, ½ in. and heavier	5.45c.
Standard tool steel	11.75c.
Wire, black, annealed (No. 9)	3.60c.
Wire, galv. (No. 9)	3.85c.
Tire steel, 1 x ½ in. and larger	4.11c.
Open-hearth spring steel	4.15c. to 10.15c.
Common wire nails, base per keg	\$3.70

	Per Cent Off List
Machine bolts, square head and nut:	
All diameters	65
Carriage bolts, cut thread:	
All diameters	65
*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.	
†125 lb. and more.	

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.69c.
Bars, soft steel (rounds and flats)	3.59c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.74c.
Cold-fin. rounds, shafting, screw stock	4.19c.
Hot-rolled annealed sheets (No. 24)	4.29c.
Galv. sheets (No. 24)	4.89c.
Hot-rolled sheets (No. 10)	3.59c.
Black corrug. sheets (No. 24)	4.29c.
½ Galv. corrug. sheets	4.89c.
Structural rivets	4.44c.
Boiler rivets	4.44c.

	Per Cent Off List
Tank rivets, 7/16 in. and smaller	65
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼ in. and heavier	3.30c.
*Structural shapes	3.30c.
*Soft steel bars, small shapes, iron bars (except bands)	3.45c.
†Reinforc. steel bars, sq. twisted and deformed	3.21c.
Cold-finished steel bars	4.18c.
*Steel hoops	3.80c.
*Steel bands, No. 12 and 3/16 in. incl.	3.55c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	4.15c.
†Galvanized sheets (No. 24)	4.80c.
*Hot-rolled annealed sheets (No. 10)	3.40c.
Diam. pat. floor plates, ¼ in.	5.25c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

†For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.56c.
Soft steel bars	3.25c.
†Reinforc. steel bars	3.25c.
†Cold-finished steel bars	3.95c.
Flat-rolled steel under ¼ in.	3.66c.
Cold-finished strip	3.25c.
Hot-rolled annealed sheets (No. 24)	4.31c.
Galvanized sheets (No. 24)	4.91c.
Hot-rolled sheets (No. 10)	3.41c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.66c.
*Black ann'd wire, per 100 lb.	\$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.45c.

	Per Cent Off List
Machine and carriage bolts, small	.70
Large	.65 and 10
Nuts, 100 count	.65

†Outside delivery 10c. less.

*For 5000 lb. or less.

†Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.65c.
Floor plates	5.40c.
Bars, rounds, flats and angles	3.55c.
Other shapes	3.70c.
Rail steel reforc. bars	3.40c.
Hoops and bands, 3/16 in. and lighter	3.75c.
Cold-finished bars	4.15c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.05c.
Galv. sheets (No. 24) 3750 lb. or more	4.07c.
Galvanized sheets (No. 24) over 3500 lb.	4.65c.
Hot-rolled sheets (No. 10)	3.50c.
Small rivets	.55 per cent off list
No. 9 ann'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg: Any quantity less than carload	3.04
Cement c'd nails, base 100-lb keg	3.50
Chain, lin. per 100 lb.	8.35

	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	\$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.62c.
Struc. shapes	3.50c.
Soft steel bars	3.40c.
Reinforcing bars	2.75c.
Cold-fin. flats and sq.	4.00c.
Rounds and hex.	4.00c.
Cold-rolled strip steel	3.44c.
Hot-rolled annealed sheets (No. 24)	4.46c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.72c.
Galv. sheet (No. 24)	5.00c.
Bands	3.72c.
Hoops	3.72c.
Heavy top-rolled sheets	3.47c.
Com. wire nails, base per keg	\$3.00
Black wire, base per 100 lb. (2500-lb. lots or under)	4.10c.
(Over 2500 lb.)	4.00c.

BOSTON

	Base per Lb.
Channels, angles	3.75c.
Tees and zeos, under 3"	4.00c.
H beams and shapes	3.77c.
Plates—Sheared, tank, and univ. mill, ¼ in. thick and heavier	3.78c.
Floor plates, diamond pattern	5.58c.
Bar and bar shapes (mild steel)	3.75c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.90c. to 4.90c.
Half rounds, half ovals, ovals and bevels	5.00c.
Tire steel	5.00c.
Cold-rolled strip steel	3.495c.
Cold-finished rounds, squares and hexagons	4.30c.
Cold-finished flats	4.30c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	4.55c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.44c.
Structural shapes	3.65c.
Plates	3.65c.
Floor plates	5.40c.
Hot-rolled annealed sheets	
(No. 24)*	4.34c.
Hot-rolled sheets (No. 10)	3.44c.
Galvanized sheets (No. 24)**	5.00c.
Bands and hoops	3.69c.
Cold-finished bars	4.04c.
Cold-rolled strip	3.43c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.79c.
Bolts and nuts, in cases, 65 per cent off list	
Broken cases .....	.60 per cent off
Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.	
* Under 400 lb., .50c. over base; 400 to 3499 lb., base; 3500 lb. and over, base less .25c.	
** Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3749 lb., base less .20c.; 3750 to 7499 lb., less .40c.; 7500 lb. and over, less .60c.	

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.
Common wire nails, base per keg \$2.75
Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes ..	3.56c.
Soft steel bars, rounds up to 8 in., flats and fillet angles ..	3.46c.
Soft steel bars, squares and hexagons ..	3.61c.
Hot-rolled strip ..	3.71c.
Hot-rolled annealed sheets (No. 24) ..	4.16c.
Galvanized sheets (No. 24) ..	4.76c.
Cold-finished steel bars ..	4.06c.
Structural rivets (keg lots) ..	4.21c.
Boiler rivets, cone head (keg lots) ..	4.21c.
Track spikes (keg lots) ..	4.11c.
Track bolts (keg lots) ..	5.21c.
Black annealed wire (No. 14 and heavier) ..	4.16c.
Com. wire nails and cement coated nails	
15 kegs and over ..	2.81c.
Per Cent Off List	
Machine bolts and carriage bolts, 1/2x6 and smaller ..	.65
Larger ..	.65
Coach and lag screws ..	.65
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots) ..	.65

Prices given above are delivered Milwaukee.
On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	3.60c.
Structural shapes	3.70c.
Plates	3.70c.
Cold-finished bars	4.42c.
Hot-rolled annealed sheets, No. 24	4.30c.
Galvanized sheets, No. 24	4.90c.
On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.	

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	3.50c.
Structural shapes	3.60c.
Reinforcing bars .....	....prices on application
Plates	3.60c.
Hot-rolled sheets, No. 10	3.45c.
Bands	3.50c.
Hoops	3.75c.
Special threading steel	3.60c.
Diamond pattern floor plates 1/4 in. and heavier	5.60c.
Galvanized bars, bands and small shapes	6.00c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	4.15c.
On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb. All prices are f.o.b. consumers' plants.	
For second zone add 10c. per 100 lb. for trucking.	

CHATTANOOGA

	Base per Lb.
Mild steel bars	3.71c.
Iron bars	3.71c.
Reinforcing bars	3.71c.
Structural shapes	3.81c.
Plates	3.81c.
Hot-rolled sheets No. 10	3.66c.
Hot-rolled annealed sheets, No. 24*	3.56c.
Galvanized sheets No. 24*	4.16c.
Steel bands	3.91c.
Cold-finished bars	4.51c.
* Plus mill item extra.	

MEMPHIS

	Base per Lb.
Mild steel bars	3.82c.
Shapes, bar size	3.82c.
Iron bars	3.82c.
Structural shapes	3.92c.
Plates	3.92c.
Hot-rolled sheets, No. 10	3.77c.
Hot-rolled annealed sheets, No. 24	4.67c.
Galvanized sheets, No. 24	5.27c.
Steel bands	4.02c.
Cold-drawn rounds	4.49c.
Cold-drawn flats, squares, hexagons	6.49c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list 65	
Small rivets, per cent off list 50	

NEW ORLEANS

	Base per Lb.
Mild steel bars	3.70c.
Reinforcing bars	3.50c.
Structural shapes	3.80c.
Plates	3.80c.
Hot-rolled sheets, No. 10	3.85c.
Hot-rolled annealed sheets, No. 24	4.55c.
Galvanized sheets, No. 24	4.95c.
Steel bands	4.25c.
Cold-finished steel bars	4.55c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	\$2.80
Bolts and nuts, per cent off list 70-10	

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.75c.	4.00c.	3.95c.
Shapes, standard ..	3.75c.	4.00c.	3.95c.
Soft steel bars ..	3.85c.	4.00c.	4.10c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports ..	2.725c.	2.725c.	3.725c.
Hot-rolled annealed sheets (No. 24) ..	4.65c.	4.60c.	4.85c.
Hot-rolled sheets (No. 10) ..	3.95c.	4.15c.	4.10c.
Galv. sheets (No. 24 and lighter) ..	5.25c.	5.05c.	5.35c.
Galv. sheets (No. 22 and heavier) ..	5.50c.	5.20c.	5.35c.
Cold finished steel			
Rounds	6.30c.	6.35c.	6.60c.
Squares and hexagons ..	7.55c.	7.60c.	6.60c.
Flats	8.05c.	8.10c.	7.60c.
Common wire nails—base per keg less carload	\$3.10	\$3.05	\$3.10
All items subject to differentials for quantity.			

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	\$48.00
High-heat duty, New Jersey ..	58.00
High-heat duty, Ohio	43.00
Intermediate, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	43.00
Intermediate, New Jersey	46.00
No. 1, Ohio	40.00
Ground fire clay, per ton	7.00
5 per cent trade discount on fire clay brick.	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$48.00
Chicago District	57.00
Birmingham	48.00
Silica cement per net ton	8.50
5 per cent trade discount on silica brick.	

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester ..	\$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	\$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	42.00
Domestic, f.o.b. Chewelah, Wash.	24.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$22.75
F.o.b. Bethlehem, Birdsboro, and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.27
Delivered Newark or Jersey City	23.39
Delivered Philadelphia	22.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	21.00
F.o.b. Jackson, Ohio	22.75
Delivered Cincinnati	21.07
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	18.50
Delivered San Francisco, Los Angeles or Seattle	23.00
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 35c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of .70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	\$22.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	20.50
Delivered Cincinnati	21.01
Delivered Canton, Ohio	21.76
Delivered Mansfield, Ohio	22.26
F.o.b. Jackson, Ohio	22.25
F.o.b. Provo, Utah	18.00
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Everett, Mass.	\$23.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Boston Switching District	24.50
Delivered Newark or Jersey City	24.39
Delivered Philadelphia	23.76
F.o.b. Buffalo and Erie, Pa., and Duluth	22.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	21.50
F.o.b. Birmingham	22.50
Delivered Cincinnati	22.51
Delivered Canton, Ohio	22.76
Delivered Mansfield, Ohio	23.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.\$25.50

Gray Forge

Valley or Pittsburgh furnace. \$20.50

Charcoal

Lake Superior furnace	\$23.50
Delivered Chicago	26.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$21.00
No. 2 fdy., sil. 1.75 to 2.25	20.50
Malleable	21.00
Basic	20.50
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Domestic, 80% (carload)	\$80.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	\$26.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 6.00 to 6.50%	\$24.50
For each additional 0.5% silicon up to 17%. 50c. a ton is added.	
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.	
Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.	

Bessemer Ferrosilicon *

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	\$29.50
10.51 to 11.00%	30.00
11.01 to 11.50%	30.50
11.51 to 12.00%	31.00
12.01 to 12.50%	31.50
12.51 to 13.00%	32.00
13.01 to 13.50%	32.50
13.51 to 14.00%	33.00
14.01 to 14.50%	33.50
14.51 to 15.00%	34.00
15.01 to 15.50%	34.50
15.51 to 16.00%	35.00
16.01 to 16.50%	35.50
16.51 to 17.00%	36.00

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del. carloads	\$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovandium, del. per lb. contained V.	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50
Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$137.50
Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$38.00
Ton lots or less, per ton	43.00
Silico-manganese, gross ton, delivered.	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00

Note: Spot prices are \$5 a ton higher except on 75 per cent ferrosilicon on which premium is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	\$4.80
Old range, non-Bessemer, 51.50%	4.65
Mesabi, Bessemer, 51.50%	4.65

Mesabi, non-Bessemer, 51.50% ..	4.50
High phosphorus, 51.50%	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	13.50c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	10.00c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	34c.
Man., African, Indian, 44-48%	25c to 30c.
Man., African, Indian, 49-51%	30c.
Man., Brazilian, 46 to 48½%	Nominal. 25c. to 30c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	\$15.25 to \$15.50
Tungsten, domestic, scheelite delivered, nominal	15.00
Chrome, 45% Cr ₂ O ₃ , lamp, c.i.f. Atlantic Seaboard (African) ..	\$17.50
45 to 46% Cr ₂ O ₃ (Turkish) ..	\$18.00 to 19.00
48% Cr ₂ O ₃ (African)	20.50
48% min. Cr ₂ O ₃ (Turkish) ..	20.90 to 21.00
Chrome concentrate, 50% and over Cr ₂ O ₃ c.i.f. Atlantic ports ..	22.00
52% Cr ₂ O ₃ (Turkish) 23.00 to 24.00	
48 to 49% Cr ₂ O ₃ (Turkish) ..	20.00 to 21.00

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$18.00
Domestic, barge and rail	18.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	23.00
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial ..	4.25c.
Del'd Ch'go, No. 5 industrial ..	3.90c.
Del'd Cleve'd, No. 3 distillate ..	6.00c.
Del'd Cleve'd No. 4 industrial ..	5.75c.
Del'd Cleve'd No. 5 industrial ..	5.00c.

COKE AND COAL

Coke Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	\$4.00 to \$4.25
Foundry, f.o.b. Connellsville, Prompt	4.50 to 5.75
Foundry, by-product, Chicago ovens	9.00
Foundry, by-product, del'd New England	12.00
Foundry, by-product, del'd Newark or Jersey City	9.60 to 10.05
Foundry, by-product, Philadelphia	9.85
Foundry, by-product, delivered Cleveland ..	10.25
Foundry, by-product, delivered Cincinnati ..	9.75
Foundry, Birmingham ..	6.50
Foundry, by-product, St. Louis, f.o.b. ovens ..	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.76

Coal Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

FOR *High Quality Steels*

NIAGARA

BRAND

FERRO-ALLOYS

FERRO SILICON
ALL GRADES

FERRO CHROMIUM
HIGH CARBON

FERRO CHROMIUM
LOW CARBON

FERRO MANGANESE
SILICO MANGANESE



PITTSBURGH
METALLURGICAL CO., Inc.

NIAGARA FALLS, N. Y.

SALES OFFICES: NEW YORK—30 Church St. • PITTSBURGH—Oliver Bldg. • CLEVELAND—Hanna Bldg.



FABRICATED STEEL

... Lettings decline to 18,910 tons from 58,500 tons last week.

o o o

... New projects advance to 18,310 tons from 14,150 tons in the previous week.

NORTH ATLANTIC STATES

Erving-Montague, Mass., 125 tons, State bridge, to Boston Bridge Works, Inc., Cambridge, Mass.

Manchester, N. H., 125 tons, State bridge, to Boston Bridge Works, Inc.

Charlestown, Mass., 115 tons, Revere Sugar Refinery addition, to Lehigh Structural Steel Co., Allentown, Pa.

Marion, Mass., 100 tons, school, to John E. Cox Co., Fall River, Mass.

Flushing, N. Y., 1600 tons, State highway bridge, to Bethlehem Steel Co.

Schenectady, N. Y., 210 tons, shop buildings, for American Locomotive Co., to American Bridge Co.

Rochester, N. Y., 200 tons, incinerator building, F. L. Hughes & Co., Rochester.

Syracuse, N. Y., 835 tons, market buildings, Central New York Regional Market Authority, to Gray Steel Corp.

Atlantic County, N. J., 350 tons, State highway bridge—Jimmy Lee Crossing, to Bethlehem Steel Co.

Hoboken, N. J., 600 tons, Alco Gravure Co., to Lehigh Structural Steel Co.

Philadelphia, 900 tons, Keebler-Wyle Baking Co. building, to Bethlehem Steel Co.

Philadelphia, 125 tons, Barrett Co., to Montgomery Iron & Steel Co., Philadelphia.

Philadelphia, 700 tons, Pennsylvania Railroad electrification program, to Lehigh Structural Steel Co.; included in last week's total awards of 28,000 tons.

THE SOUTH

Front Royal, Va., 5525 tons, new plant and power house for Viscose Co.; 1025 tons to Belmont Iron Works, Philadelphia, and 4500 tons to Bethlehem Steel Co.

Charlottesville, Va., 1150 tons, library building for University of Virginia, to Bethlehem Steel Co.

Houston, Tex., 1200 tons, American Can Co., to American Bridge Co.

CENTRAL STATES

Lima, Ohio, 365 tons, repairs to tank shop, to R. C. Mahon Co., Detroit.

Indianapolis, 965 tons, municipal shops and garage, to R. C. Mahon Co.

Des Moines, Iowa, 700 tons, packing plant, to Gage Structural Steel Co., Chicago.

Lincoln, Neb., 100 tons, viaduct, to Illinois Steel Bridge.

Santa Fe Railway, 1830 tons, bridges, to American Bridge Co.

WESTERN STATES

Cotopaxi and Montrose, Colo., 235 tons, State bridges, to American Bridge Co.

San Francisco, 200 tons, pump houses and lean-tos for Shell Oil Co., to Bethlehem Steel Co.

Palo Alto, Cal., 250 tons, building for Stanford University, to Judson Pacific Co., San Francisco.

Santa Anita, Cal., 615 tons, grandstand addition, to Virginia Bridge Co.

Los Angeles, 1000 tons, mail, express building and depot for Los Angeles Union Passenger Terminal, to Consolidated Steel Corp., Los Angeles.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Lyme, N. H., 450 tons, State bridge.

Attleboro, Mass., 100 tons, bridge.

New York, 1750 tons, garage for New York City Omnibus Co.

Raybrook, N. Y., 260 tons, State infirmary building.

Hudson County, N. J., 115 tons, West Shore Railroad bridge.

Deal, N. J., 135 tons, bridge.

Pittsburgh, 4000 tons, cranes for Carnegie-Illinois Steel Corp.

Erie, Pa., 100 tons, extension for Erie Bucyrus Co.

THE SOUTH

Great Cacapon, W. Va., 275 tons, State bridge.

Beaumont, Tex., 500 tons, power station extension, Gulf States Utilities Co.

Fordtown, Tenn., 600 tons, bridge.

Raleigh, N. C., 3300 tons, Albemarle Sound bridge and approaches; bids taken.

CENTRAL STATES

Akron, Ohio, 700 tons, South Main and Miller Streets grade-crossing eliminations.

Lima, Ohio, 500 tons, factory building, Lima Locomotive Works.

Detroit, 800 tons, addition to turbine house and boiler house, Detroit Edison Co.

Rome City, Ind., 200 tons, bridge.

State of Indiana, 100 tons, bridges; bids Feb. 9.

Schererville, Ind., 350 tons, bridge.

Cook County, Ill., 360 tons, bridges; bids Feb. 8.

Chicago, 400 tons, bridge on California Avenue.

Chicago, 360 tons, 47th Street bridge.

Wolfe Road, Ill., 435 tons, bridge.

Winfield, Mo., 2500 tons, dam across Mississippi River.

WESTERN STATES

Denver, 102 tons, road construction; bids opened.

Denver, 229 tons, bridge and approaches; bids opened.

Palisade, Colo., 250 tons, State bridges.

FABRICATED PLATES

AWARDS

Fondren, Tex., 225 tons, tank for Humble Pipe Line, to Petroleum Iron Works.

East Chicago, Ind., 1050 tons, tanks for Sinclair Refining Co., to Chicago Bridge & Iron Works.

Wheeling, W. Va., 2900 tons, 25 coal barges for Wheeling Steel Corp., to Dravo Contracting Co., Pittsburgh.

SHEET PILING

AWARDS

New York, 1400 tons, Flushing Bay boat basin, to Jones & Laughlin Steel Corp.

New York, 1600 tons, tide gate and dam, contract No. 4; tonnage evenly divided between Carnegie-Illinois Steel Corp. and Bethlehem Steel Co.

Venice, Fla., 800 tons, jetties at Casey's Pass, 400 tons to Jones & Laughlin Steel Corp., and 400 tons to Bethlehem Steel Co.

New Boston, Ill., 2000 tons, to Inland Steel Co.



Swampscott, Mass., has plans for a water main project to cost about \$27,000.

Port Isabel, Tex., closes bids about Feb. 23 for 11,500 ft. of 6 and 8-in. for water system; also for filtration plant equipment. Fund of \$32,700 has been secured through Federal aid. A. Tamm, Harlingen, Tex., is consulting engineer.

Wheaton, Minn., plans pipe lines for water system and other waterworks installation. Cost about \$80,000. Bond issue of \$44,000 has been authorized, remainder of fund to be secured through Federal aid.

Hurricane, LaVerkin and Touquerville, Utah, plan pipe lines for joint water system, bids to be asked soon. Financing has been arranged through Federal aid. W. W. Cannon, St. George, Utah, is consulting engineer.

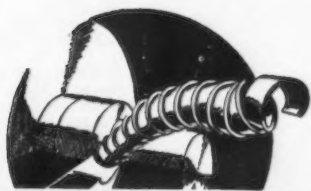
Elsmere, Ky., plans about four miles for water system; also steel water tank and other waterworks installation. Cost about \$100,000. R. C. Stout, City Hall, is engineer.

Plainview, Tex., plans pipe lines for water system; also elevated steel tank and tower, pumping machinery and other waterworks installation. Cost about \$100,000. H. N. Roberts, Lubbock, Tex., is consulting engineer.

Clay County Public Water District No. 1, care of L. E. Bates, National Bank Building, North Kansas City, Mo., attorney and representative, will take bids soon for pipe for water system in part of Clay County, totaling about 38 miles of main lines and several branch distributing lines, elevated steel tanks and towers, and other waterworks installation. Henric-Lowry Engineering Co., West Tenth Street Building, Kansas City, Mo., is consulting engineer. Cost about \$400,000.

Tulsa, Okla., plans 24-in. main pipe line for water system in Peoria Avenue, between Mohawk Boulevard and Twenty-first Street. Cost about \$215,000. Work will be carried out in connection with waterworks extensions and improvements to cost \$330,000. W. F. Graham is city water commissioner.

South Pasadena, Cal., has awarded 129 tons to United States Pipe & Foundry Co.



THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... *Flood in Cincinnati district causes further delays in deliveries*

• • •

... *Work of rehabilitating flooded industrial plants now under way*

• • •

... *January business, while below December level, was surprisingly good*

Cincinnati

EXCEPT for a few plants in the flooded area, machinery plants were in production the past week at an average of about 60 per cent. Operations are overshadowed by impending exhaustion of castings inventories since local foundries are still unable to operate and will require several weeks after high water recedes to start melting. Power difficulties are being overcome and by the end of this week near to normal operations in all except flooded plants are expected.

Cleveland

THE effect of the Ohio River flood last week, which inundated several of the Cincinnati machine tool plants, is being felt in this territory, both by machinery buyers and distributors. Communication with Cincinnati plants was cut off for several days, and delivery of machines on order will have to be extended perhaps several weeks. In addition to damage done to the machinery equipment in these plants, new machines about ready for shipment, it is stated, will have to be dismantled. New business is rather light and inclined mostly to single tool orders from industries outside of the automotive field. Demand for automatic machines continues good and deliveries of some models have been extended until August.

An order for eight machines for shipment to Italy was placed during the week with a Cleveland turret lathe manufacturer.

The Weatherhead Co., Cleveland, which is equipping a new plant, is purchasing considerable machinery and the American Fork & Hoe Co.

is in the market for some equipment for its Ashtabula, Ohio, plant.

Chicago

DELIVERIES are in for further delays as a result of idle machine tool plants in the flood area. Some shops are under water, while others are idle because of lack of power and normal water supplies. It is estimated that in many cases deliveries from the flooded area will be delayed another month. Boring mill equipment is headed for a price advance about Feb. 5.

Inquiries in this area are brisk and new sales are being added daily to dealers' books. The Milwaukee Road is tabulating bids on its list, and farm implement manufacturers are again in the market with new budgets.

Pittsburgh

FOLLOWING the large volume of machine tool orders in December, both inquiries and orders have now resumed a normal course. While the volume of business being placed at this time in the aggregate is not as great as that which occurred in December, it compares favorably with transactions of last September, October and November. New business is emanating from customers who are urgently in need of new equipment. Owing to the avalanche of business placed in December, delivery schedules are in a muddle. Dealers are of the opinion that the machine tool business will show no drastic drop-off in the coming months, even taking into account the labor situation. It is obvious that the delivery situa-

tion will not get any better, owing to heavy backlogs and shortage of skilled labor at machine tool plants.

Detroit

THERE has been practically no change in the Detroit machinery market. Chrysler, with three big programs in the wind on 1938 cylinder blocks and other motor components, appears to be holding off, so far as any definite action is concerned, until the present labor situation is clarified. Ford continues to buy some machinery and General Motors remains out of the market, although a few spot orders for fill-in equipment have been reported.

It is yet too early to know just what equipment will be purchased by Graham-Paige in its program to produce a farm tractor to be marketed by Sears, Roebuck & Co. Probably a few fill-in machines will be purchased to bolster up the present six-cylinder line.

New York

THE attention of the machine tool trade is focused upon Cincinnati. Production has been suspended pending the renewal of adequate power facilities and the rehabilitation of those plants which were under water. Shipments, consequently, have been delayed, and already lengthy delivery promises are being extended even further. Although some plants were not affected by the water, the failure of power plants and the inability of employees to reach their jobs made operations impossible. Notwithstanding the difficulties brought about by the flood, business continues to come in at about the same rate as earlier in the month, and shows no signs of decreasing. The New York Central has resumed tool purchasing and is inquiring for six machines, which, it is understood, are to be used in Ohio.

Coke Output in 1936 Gains 11,175,826 Tons

PRODUCTION of coke in December aggregated 4,608,655 net tons, of which 4,348,055 tons was by-product and 260,600 tons beehive coke. This compares with total production of 4,288,392 tons in November and 3,488,818 tons in December, 1935. Daily output in December averaged 150,283 tons, or 4 per cent above November's 144,546 tons.

Total production in 1936 was 46,317,087 tons, divided 44,504,487 tons for by-product and 1,812,600 tons for beehive ovens, and comparing with total 1935 output of 35,141,261 tons, an increase of 11,175,826 tons, or 31.8 per cent.



PLANT EXPANSION AND EQUIPMENT BUYING

... Dixie Refining Co., Detroit, plans erection of an oil refinery at Riverview, Mich., at a cost of about \$1,000,000 with equipment.

o o o

... Burroughs Adding Machine Co., Detroit, has let contract for a new plant at Plymouth, Mich., to cost close to \$500,000 complete.

o o o

... National Tire & Rubber Co., East Palestine, Ohio, has asked bids on a new plant at Elizabethton, Tenn., to cost about \$235,000 with equipment.

◀ NORTH ATLANTIC ▶

American Can Co., 230 Park Avenue, New York, has let general contract to J. E. Smith Corp., Shell Building, Houston, Tex., for one-story branch plant on 15-acre tract at Lockwood Street and Clinton Drive, Houston, totaling over 200,000 sq. ft. floor space. Cost about \$1,500,000 with equipment. New plant will occupy close to six acres, with remainder to be used for additional units in future. David M. Duller, Second National Bank Building, Houston, is consulting engineer. C. G. Preis is chief engineer of company in charge.

Western Electric Co., 195 Broadway, New York, affiliated with American Telephone & Telegraph Co., has let general contract to Ferro Concrete Construction Co., Cincinnati, for new two-story plant on Mougey Avenue, Cincinnati. Cost over \$100,000 with equipment. W. R. Cattelle, first noted address, is company architect.

Edwin B. Stimpson Co., 68 Franklin Avenue, Brooklyn, manufacturer of metal products, operating Stimpson Eyelet & Rivet Machine Co., same address, has filed plans for new two-story plant, 87 x 97 ft., at 791-801 Kent Avenue. Cost over \$60,000 with equipment. Allmendinger & Schlen-dorf, 356 Fulton Street, are architects.

General Electric Co., Schenectady, has plans for three-story addition to factory branch, storage and distributing plant at Dallas, Tex., 80 x 175 ft., primarily for switchgear assembling works, service and repair divisions. A section of first floor will be used for untanking large transformer units and for assembling large switchgear equipment, with installation of 10-ton traveling crane and other mechanical-handling facilities. Cost over \$250,000 with equipment. Lang & Mitchell, First National Bank Building, Dallas, are architects. Company has let contract to Mosher Steel Co., Houston, Tex., for structural

steel for two-story branch plant at Houston, 150 x 230 ft. Cost about \$200,000 with equipment.

United States Engineer Office, First District, New York, asks bids until Feb. 11 for castings, including starboard dumping gates, dumping gate rods, discharge Y pipe, discharge elbows, pump impeller, suction spool pieces, etc. (Circular 176).

Williamsburgh Power Plant Corp., 385 Flatbush Avenue Extension, Brooklyn, a subsidiary of Brooklyn-Manhattan Transit Corp., same address, has filed plans for seven-story addition to steam-electric generating station on Kent Avenue, Brooklyn, 100 x 140 ft. Installation will include two high-pressure boiler units with automatic stokers and auxiliaries, two 18,750-kw. turbo-generators and accessories. Cost close to \$4,000,000. Stone & Webster Engineering Corp., Boston, and 90 Broad Street, New York, is engineer and contractor.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 9 for motor-driven air compressors and spare parts (Schedule 9884), one worm-driven portable milling machine (Schedule 9907), two boring bars, 8-in. diameter and 15 ft. long (Schedule 9906) for Brooklyn Navy Yard.

Constructing Quartermaster, United States Military Academy, West Point, N. Y., will take bids in about 30 days for one-story equipment storage and distributing building, with service and garage facilities, for which revised plans are being drawn. Cost about \$415,000 with equipment. Also, bids will be asked soon on general contract for new ordnance and engineering laboratories, to cost about \$300,000 with equipment. Paul P. Cret, Architects' Building, Philadelphia, is architect for last noted structure.

National-Standard Co., Niles, Mich., manufacturer of steel wire products, has acquired plant and property of Athenia

Steel Co., Athenia, N. J., manufacturer of spring steel specialties, and will operate as a unit of organization.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Feb. 8 for seamless steel tubing (Circular 461); until Feb. 9, brass tubing, brass strips and brass wire (Circular 462), 260 gross stainless steel balls, 66 gross brass rivets, 40 gross steel cotter pins, 17 gross wood screws and 7000 ft. of wire cord (Circular 467).

Worthington Pump & Machinery Corp., Harrison, N. J., has let general contract to Wigton-Abbott Corp., 143 Liberty Street, New York, for one-story addition, 107 x 230 ft., for expansion in machine shop. Cost over \$150,000 with equipment.

Commanding Officer, Ordnance Department, Raritan Arsenal, Metuchen, N. J., asks bids until Feb. 23 for four portable milling machines, and two combination grinder and cut-off pedestal grinders (Circular 5), two screw-cutting portable lathes, two electric welding sets, and two 5-kw. portable gasoline engine-driven electric generating units (Circular 6).

Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has authorized electrification of lines east of Harrisburg, Pa., at cost close to \$50,000,000, including steel towers, catenary system and overhead equipment, cable and wire, substation units and other equipment. A bond issue of \$52,670,700 is being arranged, majority of fund for purpose noted.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Feb. 8 for three to five shell-turning machines (Circular 396); until Feb. 9, 48 high-speed metal-slitting saws (Circular 399); until Feb. 11, one motor-driven turret lathe, 2½-in. bar capacity (Circular 400).

◀ BUFFALO DISTRICT ▶

Armour & Co., Union Stock Yards, Chicago, have let general contract to A. Friederich & Sons Co., 710 Lake Avenue, Rochester, N. Y., for new two-story branch plant at Rochester. Cost about \$150,000 with equipment.

Universal Instruments & Metal Co., Inc., 24 Wall Street, Binghamton, N. Y., manufacturer of precision equipment and parts, plans one-story factory on Whitney Avenue. Cost close to \$50,000 with machinery.

R. & H. Chemicals Department, E. I. duPont de Nemours & Co., Buffalo Avenue, Niagara Falls, N. Y., manufacturer of industrial chemicals, etc., has let general contract to Laur & Mack, 1400 College Avenue, for one-story addition. Cost over \$50,000 with equipment. Main office of company is in duPont Building, Wilmington, Del.

◀ NEW ENGLAND ▶

Manchester Silver Co., 49 Pavilion Avenue, Providence, R. I., manufacturer of plated wares, has let general contract to John G. McPherson, Inc., 150 Rochambeau Avenue, for two-story addition, 55 x 95 ft. Cost close to \$50,000 with equipment.

Draper Corp., Hopedale, Mass., manufacturer of textile mill machinery and parts, will establish new branch plant at East Spartanburg, S. C., where property has been taken over. About 200 persons will be employed.

Lyon Brothers Corp., 31 Mulberry Street, Worcester, Mass., manufacturer of malt products, has plans for addition and improvements in present plant. Cost about \$50,000 with equipment.

Hartford Electric Light Co., Hartford, is arranging bond issue of \$5,000,000, considerable part of fund to be used for expansion and improvements in plant and system. Plans are under way for addition to South Meadows steam-electric generating plant, to include installation of new 40,000-kw. steam turbo-generator unit and accessories, high-pressure boiler and other equipment. Cost about \$3,500,000. Stone

Welcome the Man ...who wears **THIS PIN**

**He can save you
work, worry, money**

THIS EMBLEM is the official identification of the National Industrial Distributors' Foundation... an organization formed by leading industrial distributors who seek to promote highest standards of service to Industry. Every member possesses recognized ability, and verified facilities for rendering a complete service.

The man who wears this Emblem represents a local member distributor. He warrants a welcome. He places at your command facilities which he maintains as a "cooperative service" for you and other users of industrial supplies and equipment... facilities which you can share with other buyers to avoid work, worry and expense in purchasing and stocking the bulk of your plant requirements.

He offers you the advantages of: 1. Expert buying service that "narrows-down" your work of selecting supplies. 2. Superior warehousing facilities that enable you to limit plant stocks, and reduce stock-carrying charges. 3. To-your-door delivery that cuts down shipping and trucking expense. 4. One-source supply which enables you to obtain many items with a single order. 5. An information service that gives you latest unbiased product-and-price data without bother or delay.

While you may know this distributor, now, and use his service to some extent, it will pay you to get-together with him and plan ways to make FULL use of his money-saving facilities.



**NATIONAL INDUSTRIAL
DISTRIBUTORS' FOUNDATION**

of the I. S. R. B.; an activity of the National Supply & Machinery Distributors Assn.; Southern Supply & Machinery Distributors Assn.; and American Supply & Machinery Mfrs. Assn.

& Webster Engineering Corp., 49 Federal Street, Boston, is consulting engineer.

Godfrey L. Cabot, Inc., 77 Franklin Street, Boston, manufacturer of carbon black and allied products, has approved plans for new carbon black plant at Wicket, Tex., with compressor station and other facilities to handle about 20,000,000 cu. ft. of natural gas per day. Cost over \$150,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 12 for one drop forge trimming press (Schedule 2910) for Boston Navy Yard.

◀ WASHINGTON DIST. ▶

Chemical Warfare Service, Edgewood Arsenal, Md., asks bids until Feb. 28 for one 48-in. centrifuge, suspended type (Circular 86); until Feb. 24, eight cylindrical packeted, welded steel closed vertical tanks (Circular 87).

William Schluderberg-T. J. Kurdle Co., Baltimore and Eaton Streets, Baltimore, meat packer, has let general contract to E. Eyring & Sons Co., 808 South Conkling Street, for three-story oil refining unit, 50 x 70 ft. Cost over \$85,000 with equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Feb. 11 for two galvanized hot-water storage tanks, 48-in. diameter and 72-in. shell length, extra heavy steel riveted and caulk welded (Proposal 398-83); until Feb. 15, one vertical boiler, dry-top type, 54-in. inside diameter (Proposal 398-76).

Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, is arranging fund of \$7,000,000 for expansion and improvements in plants, of which about \$5,000,000 will be used for extensions in transmission and distributing lines, power substation facilities and other electrical distribution work. Gas generating plants will be improved, with installation of additional equipment, estimated at \$200,000.

General Purchasing Officer, Panama Canal, Washington, asks bids until Feb. 11 for 11,000 lb. steel wire finishing nails, 86,000 lb. common wire nails, 2500 lb. galvanized common wire nails, 8000 lb. galvanized iron or steel flooring nails, 4000 lb. galvanized boat spikes, 41,000 ft. of wire rope, 9000 ft. cast steel wire rope, plow steel wire rope, galvanized steel seizing strand, copper wire, soft steel wire, two five-ton chain hoists and other equipment (Schedule 3220).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 9 for one motor-driven tool-room lathe, with universal relieving attachment (Schedule 9844), one motor-driven rotary swedging machine (Schedule 9845), one universal precision-type tool head and one head for machine hone (Schedule 9841), one motor-driven wood shaper (Schedule 9865), four electric arc welding sets (Schedule 9872) for Eastern and Western Navy yards; two motor-driven shapers (Schedule 9889) for Philadelphia yard; until Feb. 12, steel bolts and nuts, lag screws, etc. (Schedule 9848), portable boiler-test hand pumps, spare gages, tools and wrenches (Schedule 9898) for Eastern and Western yards.

Norfolk & Western Railway Co., Norfolk, Va., Clyde Cocke, purchasing agent, asks bids until Feb. 10 for one year's requirements of air brake equipment and parts (Contract Serial AA-704).

◀ SOUTH ATLANTIC ▶

Sonoco Products Co., Hartsville, S. C., manufacturer of paper board products, news board, paper tubing, etc., has let general contract to Fiske-Carter Construction Co., Spartanburg, S. C., for two additions, two stories, 125 x 425 ft., and one story, 60 x 325 ft., respectively, for general production, storage and distributing divisions; also for new steam-electric power building for increased capacity. Cost close to \$450,000 with equipment. C. K. Dunlap is secretary.

United States Engineer Office, Charleston, S. C., asks bids until Feb. 11 for one portable pipe and rod-threading machine (Circular 53).

Quartermaster, CCC, Fort Screven, Ga., asks bids until Feb. 23 for one deep-well pumping head and one deep-well cylinder (Proposal 5409-19).

◀ SOUTH CENTRAL ▶

National Tire & Rubber Co., East Palestine, Ohio, has asked bids on general contract for new plant on tract recently acquired at Elizabethton, Tenn., comprising three main one-story units, each about 55 x 300 ft., with steam power house, 32 x 60 ft., and office building. Cost close to \$235,000 with machinery.

Flintkote Co., 50 West Fifth Street, New York, manufacturer of roofing products, has let general contract to H. T. Makofsky Co., 3034 Palmyra Street, New Orleans, for one-story plant, 70 x 115 ft., at New Orleans. Cost about \$500,000 with equipment. Billingsley Engineering Co., Interstate Bank Building, New Orleans, is engineer.

United States Engineer Office, Vicksburg, Miss., asks bids until Feb. 9 for 38,000 lin. ft. plow steel wire rope (Circular 165); until Feb. 23, constructing and delivering one steel derrick-barge and derrick (Circular 166).

Bunkie Coca-Cola Co., Jefferson Highway, Bunkie, La., will take bids soon on general contract for one-story mechanical-bottling plant. Cost about \$45,000 with equipment. Stone & Pitts, Goodhue Building, Beaumont, Tex., are architects.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Feb. 9 for floating bulkhead gate for Wheeler Dam, 48 x 21 x 5 ft. (shipped in two sections), with piping, valves and auxiliary equipment; until Feb. 16, one 100-ton trolley unloading crane for power house at Pickwick Landing Dam.

◀ WESTERN PA. DIST. ▶

Keystone Machine Co., North Water Avenue, Sharon, Pa., manufacturer of machinery and parts, has been acquired by new interests, headed by C. E. Fessler, Pittsburgh, heretofore connected with Fessler & Co., Pittsburgh, distributor of steel mill equipment. New owner plans extensions and improvements in plant, including machinery for manufacture of mill equipment.

United States Engineer Office, Pittsburgh, asks bids until Feb. 11 for three internal combustion engine-driven electric generating units for Emsworth lock and dam, Ohio River (Circular 273).

Minnesota Valley Canning Co., LeSueur, Minn., canner and packer of food products, plans new branch plant on 12-acre tract at Martinsburg, Pa., recently acquired, with power house, machine shop and other mechanical departments. Work will begin early in spring. Cost over \$85,000 with equipment.

◀ SOUTHWEST ▶

Falstaff Brewing Corp., 3684 Forest Park Boulevard, St. Louis, has plans by Bendernagel & Cazale, 8 Mariborough Gate, New Orleans, architects, for three-story addition, 30 x 90 ft., to branch plant at 2600 Gravier Street, New Orleans, formerly property of National Brewing Co., and improvements in present brewery. Cost close to \$150,000 with brew-house, mechanical-bottling and other equipment.

Phillips Petroleum Co., Bartlesville, Okla., and **United Carbon Co.**, Charleston, W. Va., plan joint construction of new carbon black plant in Sunray, Tex., oil field district, Moore County, where first-noted company is operating a natural gasoline processing plant; another plant of last-noted character will be erected by Magnolia Petroleum Co., Dallas, Tex., in same district, and residue gas from both plants will be available for carbon black works, which will include compressor station, power house and other mechanical divisions. Entire project will cost over \$400,000.

Seven-Up Bottling Co., 2337 Russell Boulevard, St. Louis, will take bids soon for two-story bottling plant, 100 x 125 ft., including one-story service and garage building for company trucks. Cost over \$65,000 with equipment. Emil H. Niemann, 3816 Shaw Avenue, is architect.

S. G. Adams Metalware Co., 2940 Franklin Street, St. Louis, manufacturer of sheet and pressed metal products, has let general contract to Laub Brothers Construction Co., 1819 Russell Boulevard, for one-story addition, 58 x 62 ft. Cost about \$40,000 with equipment. Charles H. Distering, Title Guarantee Building, is architect; Kosner Engineering Co., Syndicate Trust Building, is engineer.

Commanding Officer, Ordnance Department, San Antonio Arsenal, San Antonio, Tex., asks bids until Feb. 17 for two three-ton and one one-ton electric chain hoists (Circular 9).

Quartermaster, Army and Navy General Hospital, Hot Springs, Ark., asks bids until Feb. 17 for nails, staples, bolts, nuts, screws, washers, expansion shields, hacksaw blades, anchors, steel pins and other equipment (Proposal 400-14).

◀ OHIO AND INDIANA ▶

Joyce-Cridland Co., North Findlay Street, Dayton, Ohio, manufacturer of automobile jacks, hydraulic jacks and kindred equipment, is securing general erection estimates from H. K. Ferguson Co., Cleveland, general contractor, for one and two-story plant on East First Street, 100 x 290 ft. Cost close to \$100,000 with equipment.

Industrial Rayon Corp., West Ninety-eighth Street and Walford Avenue, Cleveland, is arranging for sale of 247,625 shares of stock to provide funds for expansion, including new mill near Painesville, Ohio, where over 500 acres was acquired last fall. New plant will consist of one and multi-story units, with power house, pumping station, machine shop and other mechanical departments. Cost close to \$10,000,000; also for expansion and improvements in Cleveland mill, to cost about \$3,500,000. Wilbur Watson & Associates, Inc., 4614 Prospect Avenue, Cleveland, is architect and engineer for first-noted project.

Hudepohl Brewing Co., 40 East McMichen Avenue, Cincinnati, will ask bids on general contract this month for two-story addition, 40 x 100 ft., for expansion in mechanical-bottling division. Cost over \$60,000 with equipment. Richard Griesser & Son, 64 West Randolph Street, Chicago, are architects.

Martin Brothers Electric Co., 1858 East Fortieth Street, Cleveland, manufacturer of electrical appliances and equipment, has plans by Leonard L. Broida, 1643 Lee Road, architect, for two-story and basement factory, 120 x 150 ft., at Perkins Avenue, N.E., and East Thirty-sixth Place. Cost close to \$65,000 with equipment.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Feb. 10 for fuel pressure signal assemblies (Circular 473), one motor-driven air compressor (Circular 476).

American Foundry Equipment Co., South Byrkit Street, Mishawaka, Ind., has let general contract to Peter Schumacher & Sons, Mishawaka, for two one-story additions for expansion in assembling department and for engineering unit.

Public Service Co. of Indiana, Traction Terminal Building, Indianapolis, plans expansion and modernization in steam-electric generating plant at Edwardsport, Ind., including new high-pressure steam-generating equipment and auxiliary equipment. Cost about \$350,000.

◀ MICHIGAN DISTRICT ▶

Burroughs Adding Machine Co., 6071 Second Boulevard, Detroit, has let general contract to Esslinger-Misch Co., 159 East Columbia Street, for new one and five-story plant at Plymouth, Mich., entire unit to be 135 x 600 ft., with multi-story section, 65 x 600 ft. A tower 135 ft. high will be

COST CUT
TO LESS THAN
1/3

GISHOLT TURRET LATHES

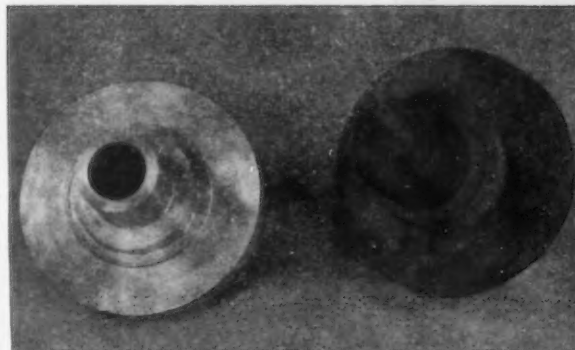
● This Gisholt 1L high production lathe now produces 3 sizes of ratchet wheels with less than half the equipment, man power and space formerly required. Time was reduced 71%—costs were cut to less than 1/3.

This is a tough job. The rough forgings (40 carbon steel) come to the machine weighing 35½ pounds each. The finished piece weighs only 17 pounds. With modern cutting tools, this Gisholt high production lathe more than trebled former production.

Made Possible by These Features, Combined Only in Gisholt Turret Lathes

- ★ Heavy, rigid machine construction, with one-piece bed and headstock and extra wide hardened steel ways, affords greater stability and permits the use of faster cutting speeds with multiple cuts.
- ★ Rapid traverse longitudinally on the turret carriage. Also both cross and longitudinal on the cross slide permit quick positioning of the tool—eliminates fatigue.
- ★ Hexagon turret rigidly held by powerful toggle-operated, double-beveled clamp ring.
- ★ Automatic indexing and clamping of the square turret tool post—saves time in carrying through a cycle of operations.
- ★ Automatic spindle brake—stops the spindle quickly without loss of time when changing pieces—also holds spindle while chucking.
- ★ Remarkable ease and speed of operations — all controls centrally located and easily handled.

Why wait until production demands become acute? Prepare now for larger capacity and lower cost. An outline of your turning problems will bring full details on the Gisholt best suited to your work.



In two operations, these ratchet wheels are machined as follows:

First: Face end of hub — drill hole, face 8" flange and 2½" hub also 4" hub simultaneously. Finish bore two diameter holes $\pm .002''$ limits. Finish turn 8" diameter flange and $3.992 \pm .001''$ hub, also $2.623 \pm .002''$ hub. dia $-.000''$

Second: Face end of hub—bore $2.375 \pm .002''$ hole, face flange and turn small shoulder — rough and finish bore $3.373 \pm .001''$ diameter hole and $2.375 \pm .002''$ hole, also $-.000''$ finish turn $3.992 \pm .001''$ diameter hub. Press in bushing $-.000''$ and finish bore $2.998 \pm .001''$ bushing and face end. $-.000''$



GISHOLT MACHINE COMPANY

1215 EAST WASHINGTON AVENUE, MADISON, WISCONSIN, U. S. A.
TURRET LATHES • AUTOMATIC LATHES
BALANCING MACHINES • TOOL GRINDERS



located in center of structure. Power house, 100 x 175 ft., also will be built. Plant will manufacture business machine accessories, including floor stands, metal chairs and other metal office furniture. Cost close to \$500,000 with machinery. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Ecorse Foundry Co., Ecorse, Mich., manufacturer of electric and cupola castings, etc., has approved plans for expansion and improvements, with facilities to increase working force by over 100 men. Cost close to \$150,000 with equipment.

Dixie Refining Co., Detroit, care of F. M. McLean, 2757 Union Guardian Building, representative, recently organized with capital of \$1,800,000, has engaged Arthur G. McKee & Co., 2422 Euclid Avenue, Cleveland, engineers and contractors, to prepare plans and supervise construction of new oil refinery on about 100-acre tract at Riverview, near Trenton, Mich. A large steel tank storage and distributing division will be built. Cost close to \$1,000,000 with equipment.

Square D Co., 6060 Rivard Street, Detroit, manufacturer of electric switches, circuit breakers, etc., has asked bids on general contract for four and five-story addition. Cost over \$125,000 with equipment. Giffels & Vallet, Inc., and L. Rossetti, Marquette Building, are architects and engineers.

◀ MIDDLE WEST ▶

Roofing Machinery Mfg. Co., 1130 West Cornelia Street, Chicago, manufacturer of machinery and parts, has plans for one-story addition, 60 x 80 ft. Cost about \$35,000 with equipment. Arthur Jacobs, 160 North LaSalle Street, is architect.

Commanding Officer, Ordnance Department, Rock Island, Ill., asks bids until Feb. 11 for three heavy tractor cranes, five medium tractor cranes and four 20-hp. light tractors (Circular 391).

International Harvester Co., 606 South Michigan Avenue, Chicago, has asked bids on general contract for one-story factory branch, storage, distributing and service plant at Houston, Tex., for motor truck division. Cost over \$75,000 with equipment.

Nebraska Power Co., Seventeenth and Harney Streets, Omaha, Neb., plans new steam-operated electric generating plant at South Omaha, where site has been selected. Natural gas will be used as fuel. New station will be used largely for power supply for industrial plants in South Omaha area and transmission and distributing lines will be built. Cost about \$1,300,000. Clarence Minard is chief engineer.

Bureau of Reclamation, Denver, asks bids until Feb. 17 for three 45-ft. x 21-ft. automatic radial steel gates for installation in spillway of Alamogordo Dam, Carlsbad project, N. M.; and three 29-ft. x 11-ft. similar steel gates for spillway of Bull Lake Dam, Riverton project, Wyo. (Specifications 878-D).

State Board of Control of State Institutions, State Capitol, Des Moines, Iowa, plans extensions and improvements in power plant at institution at Cherokee, Iowa, including new equipment. Appropriation of \$125,000 is being arranged. Also for elevated steel tank and tower for water supply at institution at Clarinda, Iowa, and for new engine-generator set for power house at Oakdale.

United States Engineer Office, Fort Peck, Mont., asks bids until Feb. 8 for six 85-hp. diesel crawler-type tractors, with mechanical angle dozers (Circular 329).

◀ PACIFIC COAST ▶

Modern Malting & Mfg. Co., Room 200-A, Rialto Building, San Francisco, Paul C. Von Gontard, president, has asked bids on general contract for new multi-unit malt products plant on South Linden Street, South San Francisco, including 200,000-bu. grain elevator, storage and distributing bins and other operating units. Cost over \$400,000 with machinery, including mechanical-handling equipment.

Crown Body Corp., Ltd., 2500 McPherson Street, Los Angeles, manufacturer of auto-

mobile bodies, has plans for one-story addition, 40 x 140 ft. Cost close to \$40,000 with equipment. George J. Fosdyke, 112 North Main Street is consulting engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 12 for one motor-driven engine lathe (Schedule 9892), one motor-driven milling machine with attachments (Schedule 9894), for San Diego Naval Station; one motor-driven bar and angle shear (Schedule 9880) for Puget Sound Navy Yard; galvanized plow steel wire rope, 1 1/4-in. diameter (Schedule 9895); until Feb. 16, one motor-driven combination grinding and buffing machine (Schedule 9911) for Mare Island yard.

Echlin Mfg. Co., 799 Golden Gate Avenue, San Francisco, manufacturer of machinery and parts, and operating a general machine works, has let general contract to Cahill Brothers, 206 Sansome Street, for three-story plant unit, 100 x 140 ft. Cost close to \$100,000 with equipment. W. D. Peugh, 333 Montgomery Street, is architect; F. W. Kellberg, 320 Market Street, is consulting engineer.

United States Engineer Office, First District, Pittock Block, Portland, asks bids until Feb. 8 for 2650 steel condenser tubes, 5/8-in. outside diameter and 110 in. long (Circular 297).

Markey Machinery Co., Inc., 85 Horton Street, Seattle, machinery and parts, plans two-story addition, 36 x 60 ft., primarily for storage and distribution.

Bureau of Reclamation, Denver, asks bids until Feb. 10 for metal-work, including steel-frame building, steel chutes and chute supports, steel hoppers and steel bin

gates for concrete-mixing plant at Boulder Dam, Boulder Canyon project (Specifications 877-D); for steel and miscellaneous parts for alterations in drum-gate operating mechanisms and controls at Arrowhead Dam, Boise project, Idaho (Specifications 876-D).

◀ FOREIGN ▶

Hiram Walker, Gooderham & Worts, Ltd., Montreal, distiller, plans new whiskey distillery on eight-acre tract at Dumbarton, Scotland, with power house, machine shop and other mechanical units, and series of multi-story storage and distributing structures. Cost over \$1,000,000. Completion is scheduled by close of 1937. Company has organized a new subsidiary under name of Hiram Walker & Sons, Ltd., Scotland, to carry out project and operate plant.

South African Paper & Pulp Industries, Ltd., Pretoria, South Africa, has plans for new pulp and paper mill, consisting of several large units, power house, pumping station and other mechanical divisions. Cost close to \$1,500,000 with machinery. C. C. Frey is secretary.

Stewarts & Lloyds, Ltd., Lion Tube Works, Old Hill, Staffordshire, England, manufacturer of seamless steel tubing and kindred steel products, has acquired former plant of Palmers Boiler Works, Ltd., Jarrow-on-Tyne, Surrey, England, comprising group of buildings on three-acre tract, and will remodel for new plant for steel tube production. Cost over \$200,000 with equipment. Tube Investments, Ltd., London, is interested in project.

Census Bureau Issues Construction Report

THE first of a series of volumes summarizing data for the construction industry was recently published by the Department of Commerce, and disclosed that 75,047 contracting establishments performed \$1,622,862,000 worth of construction work in the United States during 1935.

Comprising 116 pages and prepared by the Bureau of the Census, the report revealed that general contractors and operative builders figured in 58.2 per cent of the total amount of the work, and special trade contractors 41.8 per cent. Detailed data received from 69,838 reporting establishments showed an average during the year of 409,137 employees, with \$470,275,000 being paid out in salaries. From data submitted by a smaller group of reporting establishments, 46,429 revealed that expenditures for materials amounted to 42 per cent of the total value of the work performed, which in this case totaled \$1,330,835,000.

Figures were collected in detail for private construction and public construction and also for new construction and additions, and remodeling, repairs and maintenance. Of the total work, 55.1 per cent was private, while 44.9 per cent was public construction. New con-

struction accounted for 72.2 per cent of the total work done, and 27.8 per cent was for remodeling, repairs and maintenance.

Individual tables throughout the publication provide information as to number of establishments, total work performed, personnel, pay roll, cost of material installed, per cent of work performed represented by pay roll and by material.

Additional volumes will be issued to show work performed by type of construction, employments by functional classes, monthly data for personnel, man-hours and pay roll for productive labor, and comparisons between the 1929 and 1935 census studies.

Book Describes Tin Plate Manufacture

A SMALL book giving a résumé of tin plate manufacture is being offered at 75c. a copy by Old Castle Iron & Tin Plate Co., Ltd., Llanelly, South Wales, British Isles. The book is designed to give the non-technical reader a broad, general idea of the stages and processes in the manufacture of a sheet of tin plate. Also included are an elaborate chronology of tin plate manufacture and numerous technical tables.